From kd5byb at kd5byb.net Sun Sep 1 13:50:08 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 01 Sep 2013 12:50:08 -0500
Subject: [BoatAnchors] HP 412A VTVM problems
Message-ID: <52237E50.8070907@kd5byb.net>

Good afternoon all,

Was fixing to try some of the suggestions made recently for my Chinese 139/102E power supply filament regulator.

My solid-state Fluke 12 DMM died last week, so I've been using one of the Chinese $4 units I got at Harbor Freight.

Last night I decided that the HP 412A VTVM could use some bench time so I fired it up.

After it got warm, I noted that the readings were way off, and that even with the voltage probes shorted, the meter was a good bit below zero. (Flipping the polarity selector to "-" now made the meter go above zero.)

So I put the filament regulator aside and opened up the 412A. Tubes tested good and the power supplies (-7 VDC, +150VDC, and +255VDC) were spot on.

Okay, so it's just drifted out of cal and the zero is probably off. No big cheese. Followed the Hum Balance Adjustment procedure (not much adjustment needed), then adjusted the cathode follower voltage bias adjustment (again, not much adjustment needed).

Amplifier Gain and Meter Calibration did not go as well. With the unit fully warmed up, I cannot adjust the Amplifier Gain to get a 0 volt reading on the test voltmeter per the procedure.

On a lark, I repeated the procedure with the unit not fully warmed up and all went well. So, I know I'm looking for a heat-sensitive component that is shifting value as it warms up.

If I remember correctly, the component I'm looking for is probably a resistor.

(I should note that the paper capacitors have been replaced with modern, polypropylene units already.)

Before I go nuts, anyone had any similar with a 412A?

thanks much and 73,
ben, kd5byb

From k4oah at mindspring.com Sun Sep 1 14:22:40 2013
From: k4oah at mindspring.com (Garey Barrell)
Date: Sun, 01 Sep 2013 14:22:40 -0400
Subject: [BoatAnchors] HP 412A VTVM problems
In-Reply-To: <52237E50.8070907@kd5byb.net>
References: <52237E50.8070907@kd5byb.net>
Message-ID: <522385F0.7020602@mindspring.com>

Ben -

If it goes out after 3-10 minutes of warmup, most likely V101 or V102 suffering from grid emission. (Gas)

A resistor might go up in value over time, but it doesn't 'get better' each time it cools off.

Didja blow the fuse in the Fluke? Got the probes in the right holes??

73, Garey - K4OAH
Glen Allen, VA

Drake 2-B, 2-C/2-NT, 4-A, 4-B, C-Line
and TR-4/C Service Supplement CDs
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> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From kd5byb at kd5byb.net Sun Sep 1 14:36:12 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 01 Sep 2013 13:36:12 -0500
Subject: [BoatAnchors] HP 412A VTVM problems
In-Reply-To: <522385F0.7020602@mindspring.com>
References: <52237E50.8070907@kd5byb.net> <522385F0.7020602@mindspring.com>
Message-ID: <5223891C.40804@kd5byb.net>

Hi Gary,

It's about a 15 minute phenomenon, best I can tell. I should have a handful of 12AX7's and 6AU8's, will substitute.

The Fluke died a much longer death. It has conductive rubber "pushbuttons" and they refuse to make contact. They are a sealed unit, but I took them apart anyways, cleaned them, and put them back together. Worked for about a day. And wouldn't you know...the sealed unit is not longer available as a spare part. :(

thanks much,
ben, kd5byb

From gumbear at pacbell.net Sun Sep 1 20:17:28 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 1 Sep 2013 17:17:28 -0700
Subject: [BoatAnchors] HP 412A VTVM problems
References: <52237E50.8070907@kd5byb.net>
Message-ID: <003801cea771$d16ce200$4301a8c0@KB6NAX>

> ....On a lark, I repeated the procedure with the unit not fully warmed up
and all went well. So, I know I'm looking for a heat-sensitive
component that is shifting value as it warms up. ....

The 412A is a 100 megohm input resistance VTVM and like the 410B, also 100 meg, it's sensitive to leakage problems. Moisture + dirt are its enemies. If so, operation for some hours should dry it out a bit so the offset proiblem may diminish. If the problem is caused by grid emission it won't get better with operating time. With resistors the rub is anything that must have a low temperature coeficient will be a problem to replace. In a step voltage divider you want the tempcos to be in agreement, all in the same direction and the same % of resistance per deg. C. So proceed with care. Also, the clear range swich wafers are composed of polysulphone and can be damaged by some contact cleaners. Use only a cleaner, like Caig Lab's Fader Lube, that is kind to plastics.

Arden Allen
KB6NAX

I love a dog. He does nothing for political reasons.
-Will Rogers

From jlkolb at jlkolb.cts.com Mon Sep 2 02:08:20 2013
From: jlkolb at jlkolb.cts.com (John Kolb)
Date: Sun, 01 Sep 2013 23:08:20 -0700 (PDT)
Subject: [BoatAnchors] HP 412A VTVM problem
Message-ID: <20130902060820.BA62929C@victory.concentric.com>

Back in the '70's, I was responsible for the test equipment at Southcom International, and one of the 410B's developed a zero offset which couldn't adjusted out or fixed with tube replacement. Turned out to be a bad wire. The wire feeding the amplifier grid was slightly conductive. Replaced the wire with one with Teflon insulation and had no more trouble.

John
KK6IL

At 05:17 PM 9/1/2013, Arden Allen wrote:

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From nu4g.radio at gmail.com Mon Sep 2 02:35:46 2013
From: nu4g.radio at gmail.com (Tom Norris)
Date: Mon, 2 Sep 2013 01:35:46 -0500
Subject: [BoatAnchors] HP 412A VTVM problem
In-Reply-To: <20130902060820.BA62929C@victory.concentric.com>
References: <20130902060820.BA62929C@victory.concentric.com>
Message-ID: <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>

Yep, John, it takes VERY little extra resistance to give that meter the heebeejeebees.

On the input grid wire, even a small bit of humidity added to a track of dirt or dust on the wire that touches both the stripped end and the insulation will do the trick. Chassis dust-bunnies, anything that has vague aspirations of being conductive will affect it. Be sure the tube is clean, especially near the base. Same goes with the socket. (I mean a couple of terraOhms of dust-bunny* leakage will lead to eventual drift and non-zero-ability!) At least that was my experience with a couple of head-scratchers in my lab at work ages ago.

Cleanliness is the main thing with instruments with very high resistance inputs like that. Once repaired, it's a very nice meter that with the right probe won't load down anything and is virtually bulletproof.

Tom NU4G

*Note - Wee-teeny dust bunnies, but dust bunnies just the same. Evil critters, I tell you...

On 2 Sep 2013, at 1:08 AM, John Kolb <jlkolb at jlkolb.cts.com> wrote:

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> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From kd5byb at kd5byb.net Mon Sep 2 08:38:36 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Mon, 02 Sep 2013 07:38:36 -0500
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
Message-ID: <522486CC.1060706@kd5byb.net>

Good morning all,

Thanks much for all the great responses!

I'm going to do some more work on the unit today. As many noted, it has a 100 Megohm input resistance, so cleanliness is very important. And the amplifier circuit board on my unit is FILTHY! It makes a nice horizontal surface for dust to settle on. :(While it has lived inside the house for at least ten plus years, its not exactly dust-free in here. ;)

I have started cleaning it - once finished I'll crank it up and try again. The rest of the unit is quite clean, especially under the chassis.

I really don't want to touch anything at all on the range switch. As Arden noted, there are many carefully chosen components in there, and changing any one of them will be a crap-shoot. A range-switch problem doesn't seem to fit my problem - it doesn't get really warm down there. I'm very hesitant to use any contact cleaner on the switch at all.

Anyways, will keep everyone posted on the 412A.

thanks much and 73,

ben, kd5byb

From k4oah at mindspring.com Mon Sep 2 09:40:45 2013
From: k4oah at mindspring.com (Garey Barrell)
Date: Mon, 02 Sep 2013 09:40:45 -0400
Subject: [BoatAnchors] HP 412A VTVM problem
In-Reply-To: <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
Message-ID: <5224955D.4050104@mindspring.com>

Actually I think it's more like 200 M on ranges above about a half volt.

Humidity and bunnies wouldn't get better after about 10-15 minutes though, would they? And then revert after it cools down?

Be interesting to hear what he found.

73, Garey - K4OAH
Glen Allen, VA

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From kd5byb at kd5byb.net Mon Sep 2 13:06:45 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Mon, 02 Sep 2013 12:06:45 -0500
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <522486CC.1060706@kd5byb.net>
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
 <522486CC.1060706@kd5byb.net>
Message-ID: <5224C5A5.6010301@kd5byb.net>

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Upon power-up, the meter is dead-nuts-on zero. As the meter heats up, the negative offset appears, driving the meter below zero. (DC Volts setting) The offset is constant no matter what range I'm on.

I did some more troubleshooting - mostly checking components. I did find a drifted resistor in the Bias Adjust circuit (R115 should be 33k, was 37k, just slightly above its 10% tolerance) which was changed out with no effect.

I also spent some time looking at the -7 VDC supply. It is slightly over tolerance, -7.1 VDC instead of -6 to -7 VDC. No issues found, even when I temporarily added another 1500uF of capacitance across the 1500uF filter capacitor.

Stumped, I returned to the internet and found something interesting on Agilent's webpage. They have an archive of old manuals and old service notes, including a pile of service notes on the 412A:

<http://cp.literature.agilent.com/litweb/pdf/00412-90001.pdf>

One of them is entitled: "Installation of Zero Adjust Control" for s/n's 424-14482 and below. (Mine is 313- prefix)

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I believe I will incorporate zero adjust modification into my unit. The only issue is that is calls for some HP p/n diodes that are germanium units, and I'm doing the math to see what happens if I substitute a Schottky (lower forward voltage than germanium) or a silicon diode (higher forward voltage than germanium). The other trick will be how to mount it...the HP directions place the ZERO ADJUST pot almost right on top of the METER ZERO pot, so that won't work...

thanks much and 73,
ben, kd5byb

From 1oldlens1 at ix.netcom.com Mon Sep 2 13:19:01 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)

Date: Mon, 2 Sep 2013 10:19:01 -0700 (GMT-07:00)
Subject: [BoatAnchors] Update, HP 412A VTVM problem
Message-ID: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>

Have you tried swapping tubes yet? Also, since this is heat related perhaps a heat gun would help find the source of the problem.

There is an interesting discussion in the introduction to the handbook of problems of thermally generated voltages such as inadvertent thermocouples in the wiring the meter is connected to. These meters are so sensitive that such problems become evident where they would not with a less sensitive meter.

-----Original Message-----
>From: Ben Hall <kd5byb at kd5byb.net>
>Sent: Sep 2, 2013 10:06 AM
>To: boatanchors at theporch.com
>Subject: Re: [BoatAnchors] Update, HP 412A VTVM problem
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From: k4oah at mindspring.com (Garey Barrell)
Date: Mon, 02 Sep 2013 13:33:48 -0400
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <5224C5A5.6010301@kd5byb.net>
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
 <522486CC.1060706@kd5byb.net> <5224C5A5.6010301@kd5byb.net>
Message-ID: <5224CBFC.2090002@mindspring.com>

Have you subbed the tubes??

73, Garey - K4OAH
Glen Allen, VA

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Date: Mon, 02 Sep 2013 12:39:18 -0500
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
References: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
Message-ID: <5224CD46.10409@kd5byb.net>

> Have you tried swapping tubes yet?

Hi Richard and group,

Not yet. I did check both the 12AX7 and 6AU8 for gas using the TV-7.
Both passed with flying colors.

I had to put in an order for the 6AU8 and haven't found my stash
of 12AX7's yet, so when I've got the 6AU8 in hand and find the 12AX7's,
I'll give the tube swap a whirl.

I should have noted below that while I do intend to incorporate the
zero-adjust modification, I don't have the parts in my stash. It will

be a good bit of time before I've got the parts together. I have many other things to try first. Tube swap being one of them.

> Also, since this is heat related
> perhaps a heat gun would help find the source of the problem. There
> is an interesting discussion in the introduction to the handbook of
> problems of thermally generated voltages such as inadvertent
> thermocouples in the wiring the meter is connected to. These meters
> are so sensitive that such problems become evident where they would
> not with a less sensitive meter.

I've thought about doing the reverse - using a can of cold spray. But, thinking about it...I do have a hot-air rework station where I can carefully control the temperature. That might be better than a heat gun.

thanks much and 73,
ben, kd5byb

From k4oah at mindspring.com Mon Sep 2 13:58:55 2013
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Date: Mon, 02 Sep 2013 13:58:55 -0400
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 <5224CD46.10409@kd5byb.net>
Message-ID: <5224D1DF.6030407@mindspring.com>

Ben -

Very few, if any, tube testers will test for 'gas' (grid emission). Plus the tube has to heat up for 5-15 minutes
before it shows up!

Most likely the 6AU8.... Cleaning certainly won't hurt, but I wouldn't make any mods or repairs without swapping tubes.

73, Garey - K4OAH
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Ben Hall wrote:
>> Have you tried swapping tubes yet?
>

```
> Hi Richard and group,
>
> Not yet.  I did check both the 12AX7 and 6AU8 for gas using the TV-7. Both
passed with flying colors.
>
> I had to put in an order for the 6AU8 and haven't found my stash
> of 12AX7's yet, so when I've got the 6AU8 in hand and find the 12AX7's, I'll
give the tube swap a whirl.
>
> I should have noted below that while I do intend to incorporate the zero-adjust
modification, I don't have the parts
> in my stash. It will be a good bit of time before I've got the parts together. I
have many other things to try first.
> Tube swap being one of them.
>
> > Also, since this is heat related
>> perhaps a heat gun would help find the source of the problem. There
>> is an interesting discussion in the introduction to the handbook of
>> problems of thermally generated voltages such as inadvertent
>> thermocouples in the wiring the meter is connected to. These meters
>> are so sensitive that such problems become evident where they would
>> not with a less sensitive meter.
>
> I've thought about doing the reverse - using a can of cold spray. But, thinking
about it...I do have a hot-air rework
> station where I can carefully control the temperature.  That might be better
than a heat gun.
>
> thanks much and 73,
> ben, kd5byb



From gumbear at pacbell.net  Mon Sep  2 14:42:57 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 11:42:57 -0700
Subject: [BoatAnchors] HP 412A VTVM problem
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
 <5224955D.4050104@mindspring.com>
Message-ID: <002a01cea80c$43029640$4301a8c0@KB6NAX>

> .....Humidity and bunnies wouldn't get better after about 10-15 minutes
though, would they?  And then revert after it cools down?  ........

The problem with moisture is two fold.  Plastic wire insulation is
hygroscopic.  It absorbs moisture over time.  Coupled with that dirt and
moisture chemically form ionic compounds that reduce the resistance of the
```

insulation. When the wire is exposed to heat the resistance of the insulation decreases but then increases over time as the moisture evaporates out of the wire. Keeping the instrument in a warm dry environment will overcome the problem to some degree   Of course the ultimate remedy is to replace the wire with new, clean wire. Surface leakage of circuit boards also suffers from the foregoing. Not so easy to replace a circuit board so proper cleaning with a low ionic content water based cleaner followed by a good dryout will help. As I mentioned in previous postings I've restored Fluke 8000 and 8600 DVM's to low offset performance by washing their circuit boards with a Crystal Simple Green solution, a low ionic content cleaner. Rinse with distilled (deionized) water and dry with applied heat.

Insulators that absorb moisture, which also includes tube sockets (the reason teflon sockets are used in ultarasensitive circuits), once dried out, can be treated with a moisture excluder. We all know that petroleum and water don't like each other. A low vapor pressure petroleum distillate we all affectionately know as oil well outlives water vapor and thus keeps water out where it's not wanted. Should I mention WD-40 again? Well, I'd rather use a lubricating cleaner solution designed for electronics like MG Chemicals Super Contact Cleaner that employs polyphenyl ether, a virtually zero vapor pressure synthetic lubricant. 'Nuf said.

About the tubes, Ben: A TV-7 and other Hickok testers DO NOT test for grid emission. Some of the B&K testers do, like the simple 606 that nobody seems is worth owning because its primary test is for emission, not dynamic transconductance. I have twp 606's and wouldn't give them up because they've proved their usefulness in rooting out IF and RF tubes that were gumming up the AVC line in receivers I've worked on. Try replacing the tubes in your 412A with new, unused tubes.

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,
and make a friend forever =:-)

From wb0eq at yahoo.com Mon Sep 2 15:06:30 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Mon, 2 Sep 2013 12:06:30 -0700 (PDT)
Subject: [BoatAnchors] HP 412A VTVM problems
Message-ID: <1378148790.91014.YahooMailNeo@web161003.mail.bf1.yahoo.com>

I recall that there at least a couple of sources who offer rubber push botton repair kits for remote controls.

This of course assumes that your HP uses those style of soft switches.

Good kits have solvent to remove & clean worn away carbon-like stuff & you apply fresh conductive material to it.

Sorry don't have any names for this.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From gumbear at pacbell.net Mon Sep 2 15:05:33 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 12:05:33 -0700
Subject: [BoatAnchors] Update, HP 412A VTVM problem
References: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
 <5224CD46.10409@kd5byb.net> <5224D1DF.6030407@mindspring.com>
Message-ID: <003001cea80f$7001b920$4301a8c0@KB6NAX>

> .....Very few, if any, tube testers will test for 'gas' (grid emission).
Plus the tube has to heat up for 5-15 minutes
before it shows up! ....

Wrong on both counts, Garey, "gas" and "grid emission" are two distinctly different problems. Gas is the result of a leaky envelope or a damaged tube where oveheating has caused evaporation of the getter and the liberation of gas molecules formerly trapped in the metal elements. Grid emission is a result of cathode material that has evaporated from the cathode and deposited on the control grid during normal operation of the tube. The control grid, because of its close proximity to the hot cathode, becomes an electron emitter that causes a control grid current that can alter bias voltage if the grid circuit is returned to high resistance such as an AVC bus line. Grid emission is not a problem if the grid circuit is returned to a low resistance such as ground or a low output resistance bias supply. The lower the value of grid circuit resistance the lower the bias offset.

Grid emission becomes evident as soon as the tube heater warms up, 10-20 seconds or so. As a tube heats up in operation for 5-15 minutes my hunch is the apparent grid emission increases as the overall temperature of the tube reaches its maximum. The effect may be the result of secondary emission from a hot screen grid.

Arden Allen
KB6NAX

If you get to thinking you're a person of
some influence, try ordering somebody
else's dog around. -Will Rogers

From kd5byb at kd5byb.net Mon Sep 2 15:14:13 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Mon, 02 Sep 2013 14:14:13 -0500
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <5224D1DF.6030407@mindspring.com>
References: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
 <5224CD46.10409@kd5byb.net> <5224D1DF.6030407@mindspring.com>
Message-ID: <5224E385.20407@kd5byb.net>

Afternoon all,

After some garage-digging, I found my box of 12AX7 pulls and, drum roll please, a 6AU8 that was not listed in my inventory. I love it when I screw up in my favor. ;)

So, I now had a pair of 12AX7's tested good and a 6AU8 that tests good ready to substitute.

I started with the 12AX7 swap. I hadn't yet read your message Garey, or else I would have started with the 6AU8 first. A used, tested good 12AX7 tube went in and 15 minutes later...the zero had drifted negative again.

I returned the original 12AX7 and installed the new-in-box 6AU8. 15 minutes later...the zero had drifted negative again.

I then spotted a muffin fan over in a fan corner of the workbench. Decided that while its not a can of freeze spray, it might tell me something. So I hooked it up and pointed it so air was blowing thru the bottom section of the meter. Almost no cooling air was going onto the amp board. No change after about 5 minutes.

So I moved the fan so it was blowing on the amp board only. Slowly, after about 5 minutes, the zero had almost returned to zero. Hhmmmn. Am I dreaming? So I shut the fan off...and five minutes later its drifted negative again. Once again I hit the amp board with the fan and after a little bit, I'm half a division away from zero (on the 1 scale).

Guess it is time to remove the amp board to give it a good looking over. Maybe I'll find a cracked solder joint or something that's generating a potential difference as it heats up.

thanks much and 73,
ben, kd5byb

On 9/2/2013 12:58 PM, Garey Barrell wrote:

> Ben -
>
> Very few, if any, tube testers will test for 'gas' (grid emission).
> Plus the tube has to heat up for 5-15 minutes before it shows up!
>
> Most likely the 6AU8.... Cleaning certainly won't hurt, but I wouldn't
> make any mods or repairs without swapping tubes.

From gumbear at pacbell.net Mon Sep 2 15:32:23 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 12:32:23 -0700
Subject: [BoatAnchors] Update, HP 412A VTVM problem
References: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
 <5224CD46.10409@kd5byb.net> <5224D1DF.6030407@mindspring.com>
 <5224E385.20407@kd5byb.net>
Message-ID: <004501cea813$2a2bc680$4301a8c0@KB6NAX>

> ....Guess it is time to remove the amp board to give it a good looking over.
  Maybe I'll find a cracked solder joint or something that's generating
a potential difference as it heats up. ....

You won't see what you're looking for, Ben. You have done a great job of describing a leaky circuit board. Short of boiling it in oil nothing else will help it unless you do a proper ionic contaminent removal process. If you can hold of some recent manufactured Simple Green and distilled waterI suggest you give the board a thorough shampooing followed by a good hot tap water rinse quickly followed by air blow off and then emersion rinse in distilled water followed by a hot dryout for a few hours in sunlight or under a toasty work lamp (be careful not to overheat). After drying out spray with lubricating contact cleaner and blow off excess.

When all is working properly again make a dust cover for your 412A and keep it away from dampness. It's a lovely meter to have and use when needed.

Arden Allen
KB6NAX

Properly trained a man can be
dog's best friend. -Corey Ford

From k4oah at mindspring.com Mon Sep 2 15:37:30 2013
From: k4oah at mindspring.com (Garey Barrell)

Date: Mon, 02 Sep 2013 15:37:30 -0400
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <003001cea80f$7001b920$4301a8c0@KB6NAX>
References: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
 <5224CD46.10409@kd5byb.net> <5224D1DF.6030407@mindspring.com>
 <003001cea80f$7001b920$4301a8c0@KB6NAX>
Message-ID: <5224E8FA.1070906@mindspring.com>

Arden -

I'm aware of the difference, should have worded it differently. The results look much the same, i.e., loss of grid
control to some degree or other.

I have a TV-7D, and yes, it tests for gas or grid emission, but I have seen lots of especially 12BA6's that lose control
after 5-15 minutes, but don't show up on a TV-7D test. Even it you let them heat up for 20 minutes. It may just be the
difference between sitting in open air on top of a tube tester or crammed in a closed cabinet with another half-dozen or
more tubes. Sure cause Drake S-Meters (and others) to drift all over during the first half-hour of on time.

I agree that grid emission is the most likely cause, especially when it takes a few minutes to appear.

73, Garey - K4OAH
Glen Allen, VA

Drake 2-B, 2-C/2-NT, 4-A, 4-B, C-Line
and TR-4/C Service Supplement CDs
<www.k4oah.com>

Arden Allen wrote:
>> .....Very few, if any, tube testers will test for 'gas' (grid emission).
> Plus the tube has to heat up for 5-15 minutes
> before it shows up! ....
>
> Wrong on both counts, Garey, "gas" and "grid emission" are two distinctly
> different problems. Gas is the result of a leaky envelope or a damaged tube
> where oveheating has caused evaporation of the getter and the liberation of
> gas molecules formerly trapped in the metal elements. Grid emission is a
> result of cathode material that has evaporated from the cathode and
> deposited on the control grid during normal operation of the tube. The
> control grid, because of its close proximity to the hot cathode, becomes an
> electron emitter that causes a control grid current that can alter bias
> voltage if the grid circuit is returned to high resistance such as an AVC

> bus line. Grid emission is not a problem if the grid circuit is returned to a low resistance such as ground or a low output resistance bias supply. The lower the value of grid circuit resistance the lower the bias offset.
>
> Grid emission becomes evident as soon as the tube heater warms up, 10-20 seconds or so. As a tube heats up in operation for 5-15 minutes my hunch is the apparent grid emission increases as the overall temperature of the tube reaches its maximum. The effect may be the result of secondary emission from a hot screen grid.
>
> Arden Allen
> KB6NAX
>
> If you get to thinking you're a person of
> some influence, try ordering somebody
> else's dog around. -Will Rogers

From gumbear at pacbell.net Mon Sep 2 15:49:13 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 12:49:13 -0700
Subject: [BoatAnchors] Update, HP 412A VTVM problem
References: <16563511.1378142342257.JavaMail.root@elwamui-little.atl.sa.earthlink.net>
 <5224CD46.10409@kd5byb.net> <5224D1DF.6030407@mindspring.com>
 <003001cea80f$7001b920$4301a8c0@KB6NAX> <5224E8FA.1070906@mindspring.com>
Message-ID: <004f01cea815$d1fad7a0$4301a8c0@KB6NAX>

> ...I'm aware of the difference, should have worded it differently. The results look much the same, i.e., loss of grid control to some degree or other.

> I have a TV-7D, and yes, it tests for gas or grid emission, but I have seen lots of especially 12BA6's that lose control after 5-15 minutes, but don't show up on a TV-7D test. Even it you let them heat up for 20 minutes. It may just be the difference between sitting in open air on top of a tube tester or crammed in a closed cabinet with another half-dozen or more tubes. Sure cause Drake S-Meters (and others) to drift all over during the first half-hour of on time.

Garey, the B&K 606 grid emission test is much more sensitive than the TV-7 gas test. The TV-7 gas test will reveal a gassy or grossly poisoned control grid tube that needs to be replaced. A sensitive grid emission test will allow tubes to be selected to be placed in circuits they are suited for. A

grid emittting tube is hell on AVC systems like in your Drake but the tube
may be just fine in another circuit.

Arden Allen
KB6NAX

Blessed is the person who has earned the love of an old dog.
- Sydney Jeanne Seward

From 1oldlens1 at ix.netcom.com Mon Sep 2 15:52:53 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Mon, 2 Sep 2013 12:52:53 -0700 (GMT-07:00)
Subject: [BoatAnchors] Update, HP 412A VTVM problem
Message-ID: <14535522.1378151573722.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>

-----Original Message-----
>From: Arden Allen <gumbear at pacbell.net>
>Sent: Sep 2, 2013 12:05 PM
>To: Garey Barrell <k4oah at mindspring.com>, boatanchors at theporch.com
>Subject: Re: [BoatAnchors] Update, HP 412A VTVM problem
>
>> .....Very few, if any, tube testers will test for 'gas' (grid emission).
>Plus the tube has to heat up for 5-15 minutes
>before it shows up! ....
>
>Wrong on both counts, Garey, "gas" and "grid emission" are two distinctly
>different problems. Gas is the result of a leaky envelope or a damaged tube
>where oveheating has caused evaporation of the getter and the liberation of
>gas molecules formerly trapped in the metal elements. Grid emission is a
>result of cathode material that has evaporated from the cathode and
>deposited on the control grid during normal operation of the tube. The
>control grid, because of its close proximity to the hot cathode, becomes an
>electron emitter that causes a control grid current that can alter bias
>voltage if the grid circuit is returned to high resistance such as an AVC
>bus line. Grid emission is not a problem if the grid circuit is returned to
>a low resistance such as ground or a low output resistance bias supply. The
>lower the value of grid circuit resistance the lower the bias offset.
>
>Grid emission becomes evident as soon as the tube heater warms up, 10-20
>seconds or so. As a tube heats up in operation for 5-15 minutes my hunch is
>the apparent grid emission increases as the overall temperature of the tube
>reaches its maximum. The effect may be the result of secondary emission

>from a hot screen grid.
>
>Arden Allen
>KB6NAX

See http://www.john-a-harper.com/tubes201/ for a pretty good explanation of both gas and grid emission.

From k4oah at mindspring.com Mon Sep 2 16:11:46 2013
From: k4oah at mindspring.com (Garey Barrell)
Date: Mon, 02 Sep 2013 16:11:46 -0400
Subject: [BoatAnchors] Update, HP 412A VTVM problem
In-Reply-To: <14535522.1378151573722.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>
References: <14535522.1378151573722.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>
Message-ID: <5224F102.4010808@mindspring.com>

Richard -

Excellent resource!   Thanks.

73, Garey - K4OAH
Glen Allen, VA

Drake 2-B, 2-C/2-NT, 4-A, 4-B, C-Line
and TR-4/C Service Supplement CDs
<www.k4oah.com>

Richard Knoppow wrote:
>   See http://www.john-a-harper.com/tubes201/ for a pretty good explanation of both gas and grid emission.
>
>
>

From wb0eq at yahoo.com Mon Sep 2 16:28:40 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Mon, 2 Sep 2013 13:28:40 -0700 (PDT)
Subject: [BoatAnchors] Fw: HP 412 paper search
In-Reply-To: <1378153087.36940.YahooMailNeo@web161001.mail.bf1.yahoo.com>
References: <1378153087.36940.YahooMailNeo@web161001.mail.bf1.yahoo.com>
Message-ID: <1378153720.96314.YahooMailNeo@web161002.mail.bf1.yahoo.com>

> From: John Sehring <wb0eq at yahoo.com>

> To: Boatanchors List <boatanchors at theporch.com>
> Cc:
> Sent: Monday, September 2, 2013 2:18 PM
> Subject: HP 412 paper search
>
> I found the errata & notes for the HP 412 at the link posted to BA ok:
>
> http://cp.literature.agilent.com/litweb/pdf/00412-90001.pdf
>
> I also tried a slight variation of that link, with a "3" at the end of
> the PDF page. ?That gave me the entire 412 ops and service manual.
>
> I have an HP 412 with ops & svc manual but didn't have the errata pages,
> so good on you!
>
> Just for the heck of it, I also went to the best Agilent web site for HP
> equipment I could find:
>
> http://www.home.agilent.com/en/pc-1000002982%3Aepsg%3Apgr/discontinued-test-measurement-equipment-manuals?&cc=CA&lc=eng
>
> I then used the search engine there to try & duplicate your search. ?For the
> 412, I could always find the "3" (whole manual) but never the errata
> pages, with a PDF name ending in "1".
>
> So, am wondering what else I needed to do to find the errata pages.
>
> The reason for my question is that I have a lot of vintage HP equipment. ?I have
> service manuals for all of them but rarely the errata or service bulletins.
> ?And, paper for some popular HP gear is nowhere to be found at the Agilent page,
> e.g. the HP 410B. ?That is puzzling to me and makes me wonder what I'm
> missing about this search.
>
> So, highly esteemed fellow boat anchorite, Ben Hall, what am I doing wrong?
>
> Thanks.
>
> --John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada
>

From nu4g.radio at gmail.com Mon Sep 2 18:37:02 2013
From: nu4g.radio at gmail.com (Tom Norris)
Date: Mon, 2 Sep 2013 17:37:02 -0500
Subject: [BoatAnchors] HP 412A VTVM problem

In-Reply-To: <5224955D.4050104@mindspring.com>
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
 <5224955D.4050104@mindspring.com>
Message-ID: <A16DCBA4-5DA4-4368-A60C-D327B8084037@gmail.com>

Yes, indeed it is. Which is good for measurements, bad for using in a dirty lab (like a jet engine test cell, for example.)

Humidity can make the bunnies more conductive, depending on the nature of the dirt they are made from -- especially if there is any oil in the conglomeration. Only has to be a little bit. Temp changes could account for changes in bunny conduction, correspondently affecting drift.
Even sans bunnies, a film of oil or moisture will give terraOhm values that may change with temp and humidity. I recall a 412 that was in a lab that used a lot of glycol baths where they kept their standards. Some way or another the inside horizontal surfaces of the meter had a nearly undetectable film of the stuff, and it would drift depending on temp, humidity and Dow-Jones aggregate value. A nice rinse of anhydrous ethanol fixed that problem. Sadly, we weren't able to sneak any of the substance out of the lab for "other" purposes, but it was the best cleaner we had since Freon TF had been banned. NOTE -- when using a fast-evap solvent like that it can make things worse by slightly chilling the components and in some cases (like in our Dimensional Lab, which was kept at 68 degrees) will make the problem worse by leaving a film of dew out of the air, depending on humidity. In case of dew (Mountain dew or otherwise) let the gear sit in the sun while you do this, or just let it sit overnight to let the condensate evaporate.

But beware where the solvent goes, even if it is something "tame" like alcohol. Some plastics will react, as will some of the inks used in marking the chassis of assorted instruments.
Use with care. In a Fluke DC voltmeter, model forgotten, that used a pair of matched NE-2A's coupled to an LDR via a plastic light pipe as the chopper circuit, it frosted the light pipe and slightly softened a thin part of the top surface, causing me to chase my tail trying to find a no-zero problem. Removing the light pipe pair and letting them sit in one of our cozy, warm storage rooms over the weekend, plus a good rubdown with a dry

rag,
fixed the problem. Just goes to show there are some sneaky problems out there and
Murphy, Wile E Coyote (Super Genius), Loki and a host of other troublemakers are
always
looking over your shoulder and snickering, wondering what to do to the next item
on your list.
heehee

One of the oddest problems I ever encountered was outside the lab and in my own
shack,
back in the days when RTTY was mechanical. I had a seperate loop supply I found
at an
FAA sale, very nice, metered, etc. After I installed it, I noticed birdies every
20 kHz
or so. They went away when I turned to supply off. All there was to the thing
was a
full wave bridge of 1n2007's, all bypassed, an oil-filled cap for filtering, a pot
for
setting current and a meter for monitoring current. Gold star to the person who
figures
out what i found was causing the problem? (I've mentioned this several times over
the
past couple decades as both the worse to troubleshoot - I was a kid - and the
easiest to
fix after I figured out the foolishly simple thing that was causing a simple power
supply
to turn into a [drifty] cal oscillator. And the signal radiated well past 30 MHz.)

73

Tom

On 2 Sep 2013, at 8:40 AM, Garey Barrell <k4oah at mindspring.com> wrote:

> Actually I think it's more like 200 M on ranges above about a half volt.
>
> Humidity and bunnies wouldn't get better after about 10-15 minutes though, would
they? And then revert after it cools down?
>
> Be interesting to hear what he found.
>
> 73, Garey - K4OAH
> Glen Allen, VA
>
> Drake 2-B, 2-C/2-NT, 4-A, 4-B, C-Line
> and TR-4/C Service Supplement CDs
> <www.k4oah.com>
>

> Tom Norris wrote:
>> Yep, John, it takes VERY little extra resistance to give that meter the heebeejeebees.
>>
>> On the input grid wire, even a small bit of humidity added to a track of dirt or
>> dust on the wire that touches both the stripped end and the insulation will do
>> the trick. Chassis dust-bunnies, anything that has vague aspirations of being
>> conductive will affect it. Be sure the tube is clean, especially near the base.
>> Same goes with the socket. (I mean a couple of terraOhms of dust-bunny*
>> leakage will lead to eventual drift and non-zero-ability!) At least that was
>> my experience with a couple of head-scratchers in my lab at work ages ago.
>>
>> Cleanliness is the main thing with instruments with very high resistance inputs
>> like that. Once repaired, it's a very nice meter that with the right probe won't
>> load down anything and is virtually bulletproof.
>>
>> Tom NU4G
>>
>> *Note - Wee-teeny dust bunnies, but dust bunnies just the same. Evil critters,
>> I tell you...
>>
>> On 2 Sep 2013, at 1:08 AM, John Kolb <jlkolb at jlkolb.cts.com> wrote:
>>
>>> Back in the '70's, I was responsible for the test equipment at
>>> Southcom International, and one of the 410B's developed a
>>> zero offset which couldn't adjusted out or fixed with tube
>>> replacement. Turned out to be a bad wire. The wire feeding
>>> the amplifier grid was slightly conductive. Replaced the wire
>>> with one with Teflon insulation and had no more trouble.
>>>
>>> John
>>> KK6IL
>>>
>>> At 05:17 PM 9/1/2013, Arden Allen wrote:
>>>
>>> The 412A is a 100 megohm input resistance VTVM and like the 410B, also 100
>>> meg, it's sensitive to leakage problems. Moisture + dirt are its enemies.
>>>
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From bkemp at bobkemp.com Mon Sep 2 19:25:25 2013
From: bkemp at bobkemp.com (bkemp at bobkemp.com)
Date: Mon, 2 Sep 2013 18:25:25 -0500
Subject: [BoatAnchors] HP 412
Message-ID: <FB27378311C841C08B1B96AD90D69B18@Bob>

Wasn't there some out fit that specialized in refurbing HP VTVM's
I dont' recall the name of the place though...anyone remember?
wa0vrc
Bob

From k1lky at earthlink.net Mon Sep 2 19:25:55 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Mon, 2 Sep 2013 19:25:55 -0400
Subject: [BoatAnchors] HP 412
In-Reply-To: <FB27378311C841C08B1B96AD90D69B18@Bob>
References: <FB27378311C841C08B1B96AD90D69B18@Bob>
Message-ID: <F128A1D2-B64B-4609-900C-BBFE72F651E0@earthlink.net>

On Sep 2, 2013, at 7:25 PM, bkemp at bobkemp.com wrote:

> Wasn't there some out fit that specialized in refurbing HP VTVM's
> I dont' recall the name of the place though...anyone remember?

Maybe Ashlely:

Kiss-Electronics
Ms Ashley Hall
183 N 5th Avenue
Cornelius, Oregon
97113

W7DUZ

www.kiss-electronics.com

Roy Morgan
k1lky at earthlink.net
K1LKY Since 1958 - Keep 'em Glowing!

From 1oldlens1 at ix.netcom.com Mon Sep 2 22:04:52 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Mon, 2 Sep 2013 19:04:52 -0700
Subject: [BoatAnchors] Update, HP 412A VTVM problem
References: <14535522.1378151573722.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>
 <5224F102.4010808@mindspring.com>
Message-ID: <CD4BE6599D2F4206A7F3D44F121215CD@VALUED20606295>

----- Original Message -----
From: "Garey Barrell" <k4oah at mindspring.com>
To: "Richard Knoppow" <1oldlens1 at ix.netcom.com>;
<boatanchors at theporch.com>
Sent: Monday, September 02, 2013 1:11 PM
Subject: Re: [BoatAnchors] Update, HP 412A VTVM problem

> Richard -
>
> Excellent resource!   Thanks.
>
> 73, Garey - K4OAH
> Glen Allen, VA

Thank you kind sir.   I don't have many specific memories of working on 412-As when at -hp-, I mostly worked on microwave stuff but did some audio. I do remember specific warnings about cleaning the range switch. These are backed up by the service notes at
http://cp.literature.agilent.com/litweb/pdf/00412-90001.pdf
as posted by John Sehring,   The service notes specify water and detergent for the earliest switches and Fresno for later ones. The switch decks I remember were as sort of translucent violet color. We routinely washed most instruments using warm water and diswashing detergent. Before washing anything not water proof was removed and covers taken off cavities etc. The instrument was first rinsed well with warm water from a hose. The washed with a solution of dishwashing detergent in warm water using a paint spray gun. I think a brush was also used. After washing the chassis was again rinsed well with warm water and then blown out with high pressure air. It was then baked in a temperature controlled electric oven at about 130 F for at least 48 hours, longer if the oven was free. This worked on nearly everything. There were limits, for

instance we did not attempt to clean military equipment from Viet Nam, typically covered with mold, that was sent to Palo Alto and I don't know what they did with it.

The 412-A is an excellent instrument and generally pretty trouble free. From reading stuff on the Agilent list the choppers evidently get tired. There is a lot of stuff in their archives about dealing with that. I don't think that's the cause of the drift described. I do remember having to select tubes.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From 1oldlens1 at ix.netcom.com Mon Sep 2 23:34:34 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Mon, 2 Sep 2013 20:34:34 -0700
Subject: [BoatAnchors] Update, HP 412A VTVM problem
References: <14535522.1378151573722.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>
 <5224F102.4010808@mindspring.com>
 <CD4BE6599D2F4206A7F3D44F121215CD@VALUED20606295>
Message-ID: <3594D37CEFFB42948BC83E45EE876D70@VALUED20606295>

----- Original Message -----
From: "Richard Knoppow" <1oldlens1 at ix.netcom.com>
To: <k4oah at mindspring.com>; <boatanchors at theporch.com>
Sent: Monday, September 02, 2013 7:04 PM
Subject: Re: [BoatAnchors] Update, HP 412A VTVM problem

>
> ----- Original Message -----
> From: "Garey Barrell" <k4oah at mindspring.com>
> To: "Richard Knoppow" <1oldlens1 at ix.netcom.com>;
> <boatanchors at theporch.com>
> Sent: Monday, September 02, 2013 1:11 PM
> Subject: Re: [BoatAnchors] Update, HP 412A VTVM problem
>
>
>> Richard -
>>

>> Excellent resource!   Thanks.
>>
>> 73, Garey - K4OAH
>> Glen Allen, VA

```
 switches and Fresno for later
              ^^^^^^
    FREON of course. My spell checker doesn't know about
Freon.
```

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From gumbear at pacbell.net Tue Sep 3 00:25:56 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 21:25:56 -0700
Subject: [BoatAnchors] HP 412A VTVM problem
References: <20130902060820.BA62929C@victory.concentric.com>
 <A2851E97-8946-40A7-929E-9AE0D59DC6EC@gmail.com>
 <5224955D.4050104@mindspring.com>
 <A16DCBA4-5DA4-4368-A60C-D327B8084037@gmail.com>
Message-ID: <003801cea860$df735f10$4301a8c0@KB6NAX>

> ....Humidity can make the bunnies more conductive, depending on the nature
of the dirt they are made from -- especially if there is any oil in the
conglomeration. Only has to be a little bit. Temp changes could account
for changes in bunny conduction, correspondently affecting drift.
Even sans bunnies, a film of oil or moisture will give terraOhm values that
may change with
temp and humidity. I recall a 412 that was in a lab that used a lot of
glycol baths where they
kept their standards. Some way or another the inside horizontal surfaces of
the meter had
a nearly undetectable film of the stuff, and it would drift depending on
temp, humidity and
Dow-Jones aggregate value. A nice rinse of anhydrous ethanol fixed that
problem. ....

Tom, I find your statement to be a bit confusing, if you won't mind my
nit-picking. Oil is both an insulator and a moisture excluder. Oil
insulates dirt and keeps moisture from allowing chemical reactions that
liberate ions into the insulator, if I understand the chemistry and physics

sufficiently. Alcohol and water have a great affinity for each other, just the opposite of oil and water. Water and alchohol dissolve together and form a solution of the two. So what I think you observed is the waterless alcohol extracted the water from the bunnies, dirt and insulation which reduced the leakage. On the other hand oil that is not well purified or has additives may be mildly acidic or alkaline and could increase leakage. That is an example why there is no "rule of thumb," no old wives' tale that will necessarily fix these problems.

Arden Allen
KB6NAX

It would be a horrible world if everything was on two legs.
-Cleveland Amory

From gumbear at pacbell.net Tue Sep 3 00:04:04 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 21:04:04 -0700
Subject: [BoatAnchors] Update, HP 412A VTVM problem
References: <14535522.1378151573722.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>
Message-ID: <003701cea860$df289a70$4301a8c0@KB6NAX>

This bears repeating:

http://www.john-a-harper.com/tubes201/

Now added to my bookmarks and copied to my computer. Thanks!

Arden Allen
KB6NAX

The average dog is a nicer person than
the average person. -Andy Rooney

From gumbear at pacbell.net Tue Sep 3 01:37:43 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 2 Sep 2013 22:37:43 -0700
Subject: [BoatAnchors] Grid emission explained
Message-ID: <004c01cea867$bc380990$4301a8c0@KB6NAX>

The discussion on Ben's HP 412A drift problem indirectly reawakened for me the issue of grid emission in tubes. Browsing the tube audio forums one has to conclude the lack of understanding of tube physics is in epidemic proportions, an inescapable plague. The terms, "grid leakage," "grid current," "leakage test," abound without a scintilla of meaningfulness. To help clear the fog away I recommend the owner's manual for the B&K 606 tube tester which contains an adequate explanation of what "grid emission" is and how the tester measures grid current that is cathode material contamination caused as differentiated from current caused by a gassy tube.

http://bama.edebris.com/manuals/b&k/606-1/

Arden Allen
KB6NAX

The great pleasure of a dog is that you
may make a fool of yourself with him
and not only will he not scold you,
but he will make a fool of himself too.
-Samual Butler

From spr at earthlink.net Tue Sep 3 02:04:35 2013
From: spr at earthlink.net (Scott Robinson)
Date: Mon, 02 Sep 2013 23:04:35 -0700
Subject: [BoatAnchors] Grid emission explained
In-Reply-To: <004c01cea867$bc380990$4301a8c0@KB6NAX>
References: <004c01cea867$bc380990$4301a8c0@KB6NAX>
Message-ID: <52257BF3.3040600@earthlink.net>

Hi Arden,

For many purposes, it doesn't matter what causes grid current to flow; the question is "how much grid current flows?" This applies to AVC errors caused by grid current in either radio or tv receivers.

I in fact *did* once see a 12BA6 pull the AVC line positive in an AA6 (yes, 6; the trouble maker was the RF amp) receiver. Drove me nuts, it did; I tore a trace off the PCB and replaced it with an insulated wire on the way to finding the real problem. Being a series string heater radio, it wasn't convenient to pull tubes one at a time and find the culprit that way.

I agree that grid emission and gas cause different effects in detail. In a 100 Megohm circuit like the HP 412, the difference may be important, but in a 1-2 megohm AVC bus, I think it matters less.

In the mid-1960s, I refined a circuit handed me for a *very* high input impedance and very low input current preamp. The first stage became a nuvistor with a mu of about 40 and the heater voltage tuned for nearly zero DC grid current. Guard shielding techniques were used to minimize input capacitance, too. The signal source was a (*very* think glass pipette, so thin that it could be inserted into a nerve cell.The glass was filled with normal saline, but the resulting source impedance was still about 100 megs. There was no PC board, and the input BNC was very close (less than half an inch) to the Nuvistor socket.

BTW, if you want zero grid current, u = 20 is wrong one way, and u = 100 wrong the other way, because of the grid position in the electron cloud surrounding the cathode. u = 40 is just about right, with a little heater voltage tuning for refinement.

"The analog way is the model way." This was Georges A. Philbrick's company motto. They were the first op-amp company, starting with tubes.

Peace,

/scott

On 9/2/13 10:37 PM, Arden Allen wrote:
> The discussion on Ben's HP 412A drift problem indirectly reawakened for me
> the issue of grid emission in tubes. Browsing the tube audio forums one has
> to conclude the lack of understanding of tube physics is in epidemic
> proportions, an inescapable plague. The terms, "grid leakage," "grid
> current," "leakage test," abound without a scintilla of meaningfulness. To
> help clear the fog away I recommend the owner's manual for the B&K 606 tube
> tester which contains an adequate explanation of what "grid emission" is
> and how the tester measures grid current that is cathode material
> contamination caused as differentiated from current caused by a gassy tube.
>
> http://bama.edebris.com/manuals/b&k/606-1/
>
> Arden Allen
> KB6NAX
>
> The great pleasure of a dog is that you
> may make a fool of yourself with him
> and not only will he not scold you,
> but he will make a fool of himself too.
> -Samual Butler
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From wb0eq at yahoo.com Tue Sep 3 21:55:20 2013

From: wb0eq at yahoo.com (John Sehring)
Date: Tue, 3 Sep 2013 18:55:20 -0700 (PDT)
Subject: [BoatAnchors] Re HP 412A
Message-ID: <1378259720.27066.YahooMailNeo@web161001.mail.bf1.yahoo.com>

Thanks to Ben for finding service notes for the HP 412.

I have found an article in the HP Journal on this item. ?Its vol.10, no. 11-12,
July-August 1959.

Enjoy!
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From kd5byb at kd5byb.net Wed Sep 4 18:43:00 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Wed, 04 Sep 2013 17:43:00 -0500
Subject: [BoatAnchors] Fw: HP 412 paper search
In-Reply-To: <1378153720.96314.YahooMailNeo@web161002.mail.bf1.yahoo.com>
References: <1378153087.36940.YahooMailNeo@web161001.mail.bf1.yahoo.com>
 <1378153720.96314.YahooMailNeo@web161002.mail.bf1.yahoo.com>
Message-ID: <5227B774.8070000@kd5byb.net>

On 9/2/2013 3:28 PM, John Sehring wrote:
>> The reason for my question is that I have a lot of vintage HP equipment. I
have
>> service manuals for all of them but rarely the errata or service bulletins.
>>   And, paper for some popular HP gear is nowhere to be found at the Agilent
page,
>> e.g. the HP 410B. That is puzzling to me and makes me wonder what I'm
>> missing about this search.
>>
>> So, highly esteemed fellow boat anchorite, Ben Hall, what am I doing wrong?

Hi John,

Honestly, I have no idea! I stumbled across those HP 412A service note
pages almost by accident. If I remember right, I had typed just "HP 412
PDF" into Google minus the "A" and the service notes were one of the
first dozen or so hits.

I couldn't make sense out of the numbering system / webpage structure
either.

thanks much and 73,
ben, kd5byb

From kd5byb at kd5byb.net Wed Sep 4 18:48:08 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Wed, 04 Sep 2013 17:48:08 -0500
Subject: [BoatAnchors] Re HP 412A
In-Reply-To: <1378259720.27066.YahooMailNeo@web161001.mail.bf1.yahoo.com>
References: <1378259720.27066.YahooMailNeo@web161001.mail.bf1.yahoo.com>
Message-ID: <5227B8A8.3030603@kd5byb.net>

Hi John and list,

On 9/3/2013 8:55 PM, John Sehring wrote:
> I have found an article in the HP Journal on this item. Its vol.10, no. 11-12, July-August 1959.

Very neat! I can't say I've heard of the HP Journal before, but I am glad that they are preserved online! I will be doing some reading there.

thanks much,
ben

From 1oldlens1 at ix.netcom.com Wed Sep 4 19:09:04 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Wed, 4 Sep 2013 16:09:04 -0700 (GMT-07:00)
Subject: [BoatAnchors] Re HP 412A
Message-ID: <729511.1378336144219.JavaMail.root@mswamui-valley.atl.sa.earthlink.net>

-----Original Message-----
>From: Ben Hall <kd5byb at kd5byb.net>
>Sent: Sep 4, 2013 3:48 PM
>To: boatanchors at theporch.com
>Subject: Re: [BoatAnchors] Re HP 412A
>
>Hi John and list,
>
>On 9/3/2013 8:55 PM, John Sehring wrote:
>> I have found an article in the HP Journal on this item. Its vol.10, no. 11-12, July-August 1959.
>
>Very neat! I can't say I've heard of the HP Journal before, but I am
>glad that they are preserved online! I will be doing some reading there.
>
>thanks much,

```
>ben

    Such is fame:-)   The Journal was a technical journal published by the company
for many years.  It has detailed descriptions of new equipment and tutorials on
various measurement techniques.  They can be found at:
http://www.hpl.hp.com/hpjournal/pdfs/IssuePDFs/hpjindex.html

-hp- also published _Bench Briefs_ with service notes and information.  There is a
partial archive at:

http://www.hparchive.com/bench_briefs.htm
```

```
From kb8tad at gmail.com  Wed Sep  4 20:50:41 2013
From: kb8tad at gmail.com (Rich Post)
Date: Wed, 4 Sep 2013 20:50:41 -0400
Subject: [BoatAnchors] Homebrew transmitter restored and on webpage
Message-ID: <CAEJr0FtZBOaDRXttt3_p_tO12jTGH0Wdkg1Ps=1OkCuJSPXh5Q@mail.gmail.com>

Hi folks,

I still have not found an article or schematic on which it may have been
based, but it has now been repaired and completed with a new on-board power
supply.  Pictures and other information are on my webpage.

<http://www.ohio.edu/people/postr/bapix/HB_xmtr.htm>

73,
Rich KB8TAD
```

```
From johnmb at nc.rr.com  Wed Sep  4 21:11:56 2013
From: johnmb at nc.rr.com (john)
Date: Wed, 04 Sep 2013 21:11:56 -0400
Subject: [BoatAnchors] Homebrew transmitter restored and on webpage
In-Reply-To: <CAEJr0FtZBOaDRXttt3_p_tO12jTGH0Wdkg1Ps=1OkCuJSPXh5Q@mail.g
 mail.com>
References: <CAEJr0FtZBOaDRXttt3_p_tO12jTGH0Wdkg1Ps=1OkCuJSPXh5Q@mail.gmail.com>
Message-ID: <6.2.1.2.2.20130904211058.02c2d010@pop-server.nc.rr.com>

Rich

That's not only very nice work that you did but a neat old transmitter that
really deserved saving.

Thanks for taking the time to share it. I always enjoy reading your repair
```

sagas.

Best 73
John K5MO

At 08:50 PM 9/4/2013, Rich Post wrote:
>Hi folks,
>
>I still have not found an article or schematic on which it may have been
>based, but it has now been repaired and completed with a new on-board power
>supply. Pictures and other information are on my webpage.
>
><http://www.ohio.edu/people/postr/bapix/HB_xmtr.htm>
>
>73,
>Rich KB8TAD
>____
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

III

From navy.radio at gmail.com Thu Sep 5 08:34:10 2013
From: navy.radio at gmail.com (Nick England)
Date: Thu, 5 Sep 2013 08:34:10 -0400
Subject: [BoatAnchors] Shelby hamfest photos
Message-ID: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>

Attendance was definitely down from the heyday of 6 years ago, but
there was plenty of BA gear there - much at very reasonable prices -
Examples - Heathkit Cheyenne + Comanche + p/s for $30 total
Nice Heath Apache - $75
Nice HQ-170 tagged at $170, then $150, then $130 - don't know what it
finally sold for

http://www.virhistory.com/ham/shelby_2013.htm

I hope others will provide more comments on the crowds, gear seen, prices, etc.
We also took a BA group photo (21 of us) that may appear in Electric Radio

Cheers,
Nick K4NYW

From oldradio at comcast.net Thu Sep 5 08:52:32 2013
From: oldradio at comcast.net (oldradio at comcast.net)
Date: Thu, 5 Sep 2013 12:52:32 +0000 (UTC)
Subject: [BoatAnchors] Shelby hamfest photos
In-Reply-To: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>
Message-ID:
<10253777.1578541.1378385552792.JavaMail.root@sz0213a.westchester.pa.mail.comcast.net>

Hi Nick,

Thanks for the tour. Wish I was there.

73, John Dilks, K2TQN

-.-

----- Original Message -----
From: "Nick England" <navy.radio at gmail.com>
To: "Old Tube Radios" <boatanchors at theporch.com>
Sent: Thursday, September 5, 2013 8:34:10 AM
Subject: [BoatAnchors] Shelby hamfest photos

Attendance was definitely down from the heyday of 6 years ago, but
there was plenty of BA gear there - much at very reasonable prices -
Examples - Heathkit Cheyenne + Comanche + p/s for $30 total
Nice Heath Apache - $75
Nice HQ-170 tagged at $170, then $150, then $130 - don't know what it
finally sold for

http://www.virhistory.com/ham/shelby_2013.htm

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We also took a BA group photo (21 of us) that may appear in Electric Radio

Cheers,
Nick K4NYW

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From kb8tad at gmail.com Thu Sep 5 12:12:40 2013
From: kb8tad at gmail.com (Rich Post)

Date: Thu, 5 Sep 2013 12:12:40 -0400
Subject: [BoatAnchors] Shelby hamfest photos
In-Reply-To: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>
References: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>
Message-ID: <CAEJr0FsQWJ2PC-sKU6_cO-Y_sYyKiNHg1GT2ufbk2B=jjg9WaQ@mail.gmail.com>

Tnx for the tour Nick. I appreciate the pics, big enough to see the prices. Wish I had been there but good thing I was NOT!

Cheers es 73,
Rich KB8TAD

From N3BJ at cox.net Thu Sep 5 13:49:34 2013
From: N3BJ at cox.net (Alan Fryer)
Date: Thu, 5 Sep 2013 13:49:34 -0400
Subject: [BoatAnchors] Shelby hamfest photos
In-Reply-To: <MQaL1m02o03BXh301QaXPv>
References: <MQaL1m02o03BXh301QaXPv>
Message-ID: <E254213CA5234AFD9F928907B285CE41@AlanHP>

Thanks, Nick, some sweet pix. Always amazed at how much I missed !

Alan, N3BJ

-----Original Message-----
From: Nick England
Sent: Thursday, September 05, 2013 8:34 AM
To: Old Tube Radios
Subject: [BoatAnchors] Shelby hamfest photos

Attendance was definitely down from the heyday of 6 years ago, but there was plenty of BA gear there - much at very reasonable prices -
Examples - Heathkit Cheyenne + Comanche + p/s for $30 total
Nice Heath Apache - $75
Nice HQ-170 tagged at $170, then $150, then $130 - don't know what it finally sold for

http://www.virhistory.com/ham/shelby_2013.htm

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We also took a BA group photo (21 of us) that may appear in Electric Radio

Cheers,
Nick K4NYW
____
BoatAnchors mailing list

BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

No virus found in this message.
Checked by AVG - www.avg.com
Version: 2013.0.3392 / Virus Database: 3222/6636 - Release Date: 09/03/13

From anchor at ec.rr.com Thu Sep 5 13:57:31 2013
From: anchor at ec.rr.com (Al Parker)
Date: Thu, 05 Sep 2013 13:57:31 -0400
Subject: [BoatAnchors] Shelby hamfest photos
In-Reply-To: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>
References: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>
Message-ID: <5228C60B.5040601@ec.rr.com>

Hi Nick,

Thanks for all the pix. It was good to see you and all the guys again.

I agree, attendance was down markedly, vs 6 yrs ago at the same location. It's hard to compare with the last 5 yrs at the Dallas, NC, locn. I think you, as always, captured most, if not all, of the BA's. I only sold an R-390/URR, and the aperiodic rcvr, plus a little edebris.

I did come away with the HT-33B amp that Larry had. I missed seeing the SP-600 you spotted, a big difference from the dozen plus that were at Dallas last yr. I believe BA prices in general have faded off a lot in the last 5 yrs.
73,

Al, W8UT
www.boatanchors.org
www.hammarlund.info

"There is nothing -- absolutely nothing -- half so much
worth doing as simply messing about in boats"
Ratty, to Mole

On 9/5/2013 8:34 AM, Nick England wrote:
> Attendance was definitely down from the heyday of 6 years ago, but
> there was plenty of BA gear there - much at very reasonable prices -
> Examples - Heathkit Cheyenne + Comanche + p/s for $30 total
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>
> http://www.virhistory.com/ham/shelby_2013.htm

>
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>
> Cheers,
> Nick K4NYW
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From w7qho at aol.com Thu Sep 5 14:14:46 2013
From: w7qho at aol.com (mac)
Date: Thu, 5 Sep 2013 11:14:46 -0700
Subject: [BoatAnchors] ***UNCHECKED*** Re: Homebrew transmitter restored
     and on webpage
In-Reply-To: <CAEJr0FtZBOaDRXttt3_p_tO12jTGH0Wdkg1Ps=1OkCuJSPXh5Q@mail.gmail.com>
References: <CAEJr0FtZBOaDRXttt3_p_tO12jTGH0Wdkg1Ps=1OkCuJSPXh5Q@mail.gmail.com>
Message-ID: <38930311-02C7-46D9-9C26-E30114CD6501@aol.com>

Looks like a collection of circuits lifted from 50s/60s handbooks and
QST, CQ, etc. articles.

Dennis D. W7QHO
Glendale, CA

****
On Sep 4, 2013, at 5:50 PM, Rich Post wrote:

> Hi folks,
>
> I still have not found an article or schematic on which it may have
> been
> based, but it has now been repaired and completed with a new on-
> board power
> supply. Pictures and other information are on my webpage.
>
> <http://www.ohio.edu/people/postr/bapix/HB_xmtr.htm>
>
> 73,
> Rich KB8TAD
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From thompson at mindspring.com Thu Sep 5 21:35:46 2013
From: thompson at mindspring.com (David Thompson)
Date: Thu, 5 Sep 2013 21:35:46 -0400
Subject: [BoatAnchors] Shelby hamfest photos
References: <CAB55hNcc3A5Wa_wdJPSOrEnqdAH-WunWwDx7W4mwc889Czh6hg@mail.gmail.com>
Message-ID: <01ba01ceaaa1$6fbc6fc0$f05d4d0c@yourxb2x7j77gn>

Nice pix but plain too see attendance down from 10 years ago. Wonder who
had the globe scout deluxe made by RME/Electro Voice?

73 Dave K4JRB

----- Original Message -----
From: "Nick England" <navy.radio at gmail.com>
To: "Old Tube Radios" <boatanchors at theporch.com>
Sent: Thursday, September 05, 2013 8:34 AM
Subject: [BoatAnchors] Shelby hamfest photos

> Attendance was definitely down from the heyday of 6 years ago, but
> there was plenty of BA gear there - much at very reasonable prices -
> Examples - Heathkit Cheyenne + Comanche + p/s for $30 total
> Nice Heath Apache - $75
> Nice HQ-170 tagged at $170, then $150, then $130 - don't know what it
> finally sold for
>
> http://www.virhistory.com/ham/shelby_2013.htm
>
> I hope others will provide more comments on the crowds, gear seen, prices,
> etc.
> We also took a BA group photo (21 of us) that may appear in Electric Radio
>
> Cheers,
> Nick K4NYW
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From kb8tad at gmail.com Thu Sep 5 21:52:23 2013
From: kb8tad at gmail.com (Rich Post)
Date: Thu, 5 Sep 2013 21:52:23 -0400

Subject: [BoatAnchors] Homebrew transmitter restored and on webpage
In-Reply-To: <38930311-02C7-46D9-9C26-E30114CD6501@aol.com>
References: <CAEJr0FtZBOaDRXttt3_p_tO12jTGH0Wdkg1Ps=1OkCuJSPXh5Q@mail.gmail.com>
 <38930311-02C7-46D9-9C26-E30114CD6501@aol.com>
Message-ID: <CAEJr0Fsi1koG4Rod4A1s4nfoRsP0nOo_TCt1mRZ9jmS0=9--Dw@mail.gmail.com>

Hi Mac,
I'm slowly coming to that conclusion. Given the quality of the work, this does not appear to be a first project so the OM may indeed have skillfully pieced together a couple of circuits. The May 1949 RCA HamTips is the first use I have been able to find for the 5763 as ham bands oscillator. The '53 Compact 75 watt is the first use of one as oscillator that I have found in the ARRL handbooks. The '54 handbook 500 Watter uses it for oscillator, buffer and multiplier.

I have looked for the full schematic in my collection of CQs from the era and found nothing. Ditto with all the 50s and 60s Handbooks (except for '52 which I don't have). I have the 12th and 15th West Coast handbooks (Bill Orr, 1949 and 1959) but not the 13th or 14th so those may be possibilities.

It's also possible that the inspiration for part of the circuit is the DX-100 or Viking II both of which use the dual 6146 and a 6AQ5 as clamp. The DX-100 also uses a 5763 as driver.

I have a Heath and a Johnson SSB adapter waiting patiently for their turn on the bench but have been hesitant to modify a DX-100 or other for the requisite connectors. But some mods to a homebrew? Why not ;-)

Tnx es 73,
Rich KB8TAD

On Thu, Sep 5, 2013 at 2:14 PM, mac <w7qho at aol.com> wrote:

>
>

From infomet at embarqmail.com Thu Sep 5 23:24:14 2013
From: infomet at embarqmail.com (Wilson)
Date: Thu, 5 Sep 2013 23:24:14 -0400
Subject: [BoatAnchors] BoatAnchors Digest, Vol 133, Issue 6
In-Reply-To: <mailman.1.1378432353.101.boatanchors@theporch.com>
References: <mailman.1.1378432353.101.boatanchors@theporch.com>
Message-ID: <084AD436275C4AD7ADD156F3A5205B2F@WilsonPC>

Mac an I went down the camper row and headed back toward the BA

neighborhood.
Somehow you got away without our realizing you were leaving. Saw the big sign as soon as we went in.
I heard some xtals went cheap. I can always use some for various xtal controlled rigs.
Saw an old tired Signal Shifter, 1942, but may never find the 1938 I want.
We saw several nice things, incl at least two HROs...too new for me.
Yes, prices slipping rapidly, as we die off. Younger people are "busy", but it's hard to say what they are accomplishing.
Most have no real hobby at all and they sure aren't going to support the BA market.
I'm plugging away at a pair of 813s in an interesting setup. Looks like it was meant to be a filament driven AB2 amp, but never finished.
Dirty after several years in a carport, but I think I can make it go.
Still have 183 amp at Todd's!
Remember CX is coming, 9/15 phone, 9/22 CW.
73,
WL

-----Original Message-----
From: boatanchors-request at theporch.com
Sent: Thursday, September 05, 2013 9:52 PM
To: boatanchors at theporch.com
Subject: BoatAnchors Digest, Vol 133, Issue 6

Send BoatAnchors mailing list submissions to
boatanchors at theporch.com

To subscribe or unsubscribe via the World Wide Web, visit
https://minime.theporch.com/mailman/listinfo/boatanchors
or, via email, send a message with subject or body 'help' to
boatanchors-request at theporch.com

You can reach the person managing the list at
boatanchors-owner at theporch.com

When replying, please edit your Subject line so it is more specific
than "Re: Contents of BoatAnchors digest..."

Today's Topics:

1. Shelby hamfest photos (Nick England)
2. Re: Shelby hamfest photos (oldradio at comcast.net)

3. Re: Shelby hamfest photos (Rich Post)
4. Re: Shelby hamfest photos (Alan Fryer)
5. Re: Shelby hamfest photos (Al Parker)
6. ***UNCHECKED*** Re: Homebrew transmitter restored and on webpage (mac)
7. Re: Shelby hamfest photos (David Thompson)
8. Re: Homebrew transmitter restored and on webpage (Rich Post)

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From garygarlic at earthlink.net Fri Sep 6 16:44:44 2013
From: garygarlic at earthlink.net (Gary Woods)
Date: Fri, 06 Sep 2013 16:44:44 -0400
Subject: [BoatAnchors] 4-400 anyone
Message-ID: <pjfk29dk3mmuvfvu7ba7nkk7pe823tph1e@4ax.com>

Looking for 1 or preferably 2 to get the Viking Kilowatt back on the air.
It had the original tubes in it until I broke an anode seal...

--
Gary Woods AKA K2AHC- PGP key on request, or at home.earthlink.net/~garygarlic
Zone 5/4 in upstate New York, 1420' elevation. NY WO G

From rbsingl at ilstu.edu Fri Sep 6 16:52:54 2013
From: rbsingl at ilstu.edu (Singley, Rodger)
Date: Fri, 6 Sep 2013 20:52:54 +0000
Subject: [BoatAnchors] 4-400 anyone
In-Reply-To: <pjfk29dk3mmuvfvu7ba7nkk7pe823tph1e@4ax.com>
References: <pjfk29dk3mmuvfvu7ba7nkk7pe823tph1e@4ax.com>
Message-ID: <0DEBF1C8D8437248BE53CD4213B89BD322F0BD4B@ISUEMBX02.ad.ilstu.edu>

Gary,

The earlier production was built with 4-250 tubes so a pair of these will be fine also, particularly if you aren't trying to run full power SSB. The 4-250 were fine for the old 1,000 KW AM rating and are loafing at the new legal limit 375 watt carrier out level.

Make sure to clean the fans and lube the fan bearings while you are in there. All of the Johnson fans are prone to shorted motor windings at this age but keeping the bearings running freely cannot hurt. One of my RF module fans went up in smoke several years ago. Also make sure the screened intake in the grid compartment is clean.

A few owners have experienced spreading of the raised lips in the pedestal that the "main frame" rides on. If this happens it will drop to the bottom of the pedestal and is impossible to remove without cutting into the sheet metal of the pedestal. The easiest prevention is to use wood blocks between the raised lips and pedestal walls to prevent this from happening.

Have fun with the Desk!

Rodger WQ9E

Dr. Rodger B. Singley
Professor of Marketing

> -----Original Message-----
> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
> Of Gary Woods
> Sent: Friday, September 06, 2013 3:45 PM
> To: boatanchors at theporch.com
> Subject: [BoatAnchors] 4-400 anyone
>
> Looking for 1 or preferably 2 to get the Viking Kilowatt back on the
> air.
> It had the original tubes in it until I broke an anode seal...
>
>
> --
> Gary Woods AKA K2AHC- PGP key on request, or at
> home.earthlink.net/~garygarlic Zone 5/4 in upstate New York, 1420'
> elevation. NY WO G ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From rbsingl at ilstu.edu Fri Sep 6 16:55:32 2013
From: rbsingl at ilstu.edu (Singley, Rodger)
Date: Fri, 6 Sep 2013 20:55:32 +0000
Subject: [BoatAnchors] 4-400 anyone
In-Reply-To: <0DEBF1C8D8437248BE53CD4213B89BD322F0BD4B@ISUEMBX02.ad.ilstu.edu>

References: <pjfk29dk3mmuvfvu7ba7nkk7pe823tph1e@4ax.com>
<0DEBF1C8D8437248BE53CD4213B89BD322F0BD4B@ISUEMBX02.ad.ilstu.edu>
Message-ID: <0DEBF1C8D8437248BE53CD4213B89BD322F0BD66@ISUEMBX02.ad.ilstu.edu>

Well, make that 1,000 Watts instead of Kilowatts :) That is what happens after spending 8 hours straight going through online training for human subjects research regulations :(

Rodger WQ9E

Dr. Rodger B. Singley
Professor of Marketing

> -----Original Message-----
> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
> Of Singley, Rodger
> Sent: Friday, September 06, 2013 3:53 PM
> To: Gary Woods; boatanchors at theporch.com
> Subject: Re: [BoatAnchors] 4-400 anyone
>
> Gary,
>
>

The 4-250 were fine for the old 1,000 KW AM rating and are
> loafing at the new legal limit 375 watt carrier out level.
>

From w6cds at aol.com Sat Sep 7 07:31:50 2013
From: w6cds at aol.com (Charles)
Date: Sat, 7 Sep 2013 07:31:50 -0400 (EDT)
Subject: [BoatAnchors] Help! Please Read - W6CDS
Message-ID: <8D079D4FAC0394A-24C0-17FED@webmail-d223.sysops.aol.com>

Hi to all.
My grandson, David Simmons is applying for a very important job
when he graduates with his Master's degree next Fall. As he explains below, he needs lots of votes, which you can do by just opening the link below and clicking "LIKE" You can do this on any computer every day until the contest is over next Sunday. Please help him get this position.
  Thank you, 73, Charles Simmons W6CDS 80 yrs old 55 yrs a ham.

Link: http://www.bestjobaroundtheworld.com/submissions/view/12069

I just applied for a one-in-a-lifetime job opportunity, Chief World Explorer for the online travel company Jauntaroo where I will be traveling the world for one year making films and blogging. The first phase of the application process is a 60-second video explaining why I am the best for the job. Part of the evaluation criteria is how many "likes" I can get for my video. If you can take 1 minute to watch my video, which I promise you'll find exciting, and "like" it, it will get me one step closure to winning this thing!

http://www.bestjobaroundtheworld.com/submissions/view/12069

David Simmons is a part of a new generation of open minded up-and-coming innovators. At the age of only 23, he is finishing up his last semester of his Master's in International Business in St. Petersburg, Russia. He has already traveled to more than 35+ countries and lived for extended stints in Germany, Russia and Siberia. Other than learning German and Russia, David also speaks French. After having worked many years in construction and playing college baseball in America, as well as for a traveling semi-professional team in Germany. Coincidentally, before this opportunity came around, David was already planning to make a film next year around the world to show the similarities of people from all different countries, cultures and religions. More information on this, and David's other film work can be found on his website www.WorldAsOneMedia.com   David is undoubtably a well-rounded individual with experiences vastly beyond his years. It's not often that you meet such a dyna
mic and interesting individual and this is portrayed through his application video above. Please help support him to achieve his goals!

From charlesmorris800 at centurytel.net Sat Sep 7 17:14:22 2013
From: charlesmorris800 at centurytel.net (Charles)
Date: Sat, 7 Sep 2013 16:14:22 -0500
Subject: [BoatAnchors] Deltron S power supply schematic?
Message-ID: <2CF193AC-DD2B-4B5C-80FE-1DF2809B52B4@centurytel.net>

I have an Deltron S-series switching power supply from about '84, specifically their model S12-10.4 (12 volts at 10.4 amps), that has a

clean DC output but does not regulate well. With only a 6 amp load the output drops from 12.0 to 11.5 volts, although it's still very clean.... The barrier strip isn't labeled although the 120 VAC, frame ground, and two pairs of two connections (strapped together) are the 12 volt outputs. There are two more connections which I am not sure what they do... trying to find a schematic for it but getting nowhere. Anyone have any information on these old open-frame switchers?
thanks
Charles

From garygarlic at earthlink.net Sat Sep 7 18:33:07 2013
From: garygarlic at earthlink.net (Gary Woods)
Date: Sat, 07 Sep 2013 18:33:07 -0400
Subject: [BoatAnchors] Deltron S power supply schematic?
In-Reply-To: <2CF193AC-DD2B-4B5C-80FE-1DF2809B52B4@centurytel.net>
References: <2CF193AC-DD2B-4B5C-80FE-1DF2809B52B4@centurytel.net>
Message-ID: <scan29t43mfiujge76jl8ttrfl0s0krkr8@4ax.com>

On Sat, 7 Sep 2013 16:14:22 -0500, you wrote:

>Anyone have any information on these old open-frame switchers?

Only generic info: Chances are that the filter caps on the secondary side have dried out. If you have an ESR meter, they're easily identified, otherwise "shotgunning" isn't a bad idea. Change all the electrolytics on the low-voltage side of the transformer, and likely things will be back to normal.
--
Gary Woods AKA K2AHC- PGP key on request, or at home.earthlink.net/~garygarlic
Zone 5/4 in upstate New York, 1420' elevation. NY WO G

From kd5byb at kd5byb.net Sat Sep 7 20:01:20 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sat, 07 Sep 2013 19:01:20 -0500
Subject: [BoatAnchors] Adventures in used test equipment.
Message-ID: <522BBE50.1070004@kd5byb.net>

Good evening all,

I put aside the HP412A VTVM for a little bit. Sometimes I figure things out when I'm not focused on them.

I'm also waiting for the zero offset-adjust circuit boards I designed to come back from the board house. Instead of mounting a terminal strip and drilling holes like the HP 412A service notes, I designed a small circuit board that will mount using a stand-off to one of the transformer mounting screws. This way, it will be totally reversible. Plus, I could use a nice ten-turn PC-board-mount trim pot.

I also got in two new bench type meters - a Fluke 8810A and a Fluke 8600A. These are to replace my broken and unrepairable Fluke 12 handheld meter. I didn't pay a lot for them...so I was expecting to have to do some repairs and calibration.

I was pleasantly surprised when both worked perfectly. I took them to work where we have a really high-accuracy calibrated meter. I was utterly dumbfounded to have the 8810 and the 8600 agree nearly perfectly with each other and the calibrated lab meter. Like I told one of my co-workers, I usually never do this well!

Interestingly, one of the electrical engineering PhD's I work with wasn't surprised, noting that the Fluke meters of the 8810 and 8600 eras were very good instruments. Total agreement here!

thanks much and 73,
ben, kd5byb

From gumbear at pacbell.net Sat Sep 7 21:07:37 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 7 Sep 2013 18:07:37 -0700
Subject: [BoatAnchors] Adventures in used test equipment.
References: <522BBE50.1070004@kd5byb.net>
Message-ID: <000f01ceac2f$d2b85820$4301a8c0@KB6NAX>

> ....I was pleasantly surprised when both worked perfectly. I took them to work where we have a really high-accuracy calibrated meter. I was utterly dumbfounded to have the 8810 and the 8600 agree nearly perfectly with each other and the calibrated lab meter. ....

I too agree. Of the dozen or so Fluke 8000 and 8600 meters I've been through even those I had to repair were still in calibration. The only problem that effected accuracy was the ones with board leakage problems but once the boards were cleaned they met spec. So the watch word is to never touch the calibration adjustments until it's known they need adjustment by comparison with an equivalent or greater accuracy meter.

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,
and make a friend forever =:-)

From spr at earthlink.net Sat Sep 7 20:09:31 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sat, 07 Sep 2013 17:09:31 -0700
Subject: [BoatAnchors] Adventures in used test equipment.
In-Reply-To: <522BBE50.1070004@kd5byb.net>
References: <522BBE50.1070004@kd5byb.net>
Message-ID: <522BC03B.5090405@earthlink.net>

I'll add to your experience mine with my 10+ year old Fluke 87 MK I.

It' still accurate, agrees with the new 87 Mk V in my office at work. I have replaced the banana jacks, $30 part and easy to do. Good gear, those Fluke 87s.

/scott robinson

On 9/7/13 5:01 PM, Ben Hall wrote:
> Good evening all,
>
> I put aside the HP412A VTVM for a little bit. Sometimes I figure things
> out when I'm not focused on them.
>
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> transformer mounting screws. This way, it will be totally reversible.
> Plus, I could use a nice ten-turn PC-board-mount trim pot.
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> 8600A. These are to replace my broken and unrepairable Fluke 12
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> work where we have a really high-accuracy calibrated meter. I was
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> with each other and the calibrated lab meter. Like I told one of my
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>
> Interestingly, one of the electrical engineering PhD's I work with
> wasn't surprised, noting that the Fluke meters of the 8810 and 8600 eras

> were very good instruments. Total agreement here!
>
> thanks much and 73,
> ben, kd5byb
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From k5apl at yahoo.com Mon Sep 9 16:49:17 2013
From: k5apl at yahoo.com (Wes Bolin)
Date: Mon, 9 Sep 2013 13:49:17 -0700 (PDT)
Subject: [BoatAnchors] R808/Grc14 Receiver Information
Message-ID: <1378759757.7421.YahooMailNeo@web164605.mail.gq1.yahoo.com>

I just purchased a R808 / Grc14 Receiver that covers 2 Mc to 32 Mc.? I am looking
for documentation for it; an owner's manual or a service
manual, and a schematic.? Not much info on the web that I can find.? Seems it has
the same spec's as the R392, but different design.? Any help
is sure appreciated..? Thanks,
Wes
Arkansas

From jharper at secureoutcomes.net Wed Sep 11 17:59:52 2013
From: jharper at secureoutcomes.net (Jack Harper)
Date: Wed, 11 Sep 2013 15:59:52 -0600
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
Message-ID: <mailman.25.1378999649.206.boatanchors@theporch.com>

Greetings to the List -

I am (slowly) restoring a Hammarlund HX-500
transmitter to life and have spent a couple of
evenings carefully testing spare tubes on my
Hickok to get the best set that I can installed into the beast.

After separating out and testing 109 tubes and
recording all that into a spreadsheet, I finally
figured out that I am not very sure about exactly what I am doing.

The spreadsheet is setup to record tubes at 100%
if they meet the minimum transconductance specified on the Hickok roll chart.

So, a tube that measures 3800 micro-mhos on the Hickok where the roll chart specifies a minimum of 3500 micro-mhos would appear on my spreadsheet as 109% (hooray!).

However, that is, I think, awfully misleading as it is 109% of the "Throw it Away" point - 100% means throw it away...

Looking tube characteristics up in the RCA Manual and comparing that to the Hickok roll charts, it seems that the Hickok declares tubes to be "Throw it Away" at something like 50% of the "normal" (new?) transconductance, though that seems to vary by tube type.

Questions:

(a) In general, why does Hickok use that ~50% drop dead point? For example, I notice that transconductance seems to vary a lot - one tube specifies 3500 when "used in triode mode"; 4000 when used in another mode; and 4500 when used normal - it also varies with voltages. My faithful tube tester certainly does not measure transconductance in "triode mode" (grids tied together?), so it is clearly a fuzzy thing, that 50% drop dead mark.

(b) In general, what is the effect on circuit operation as transconductance drops over time. Most of the tubes that I have for the HX-500 are in the 130% range - meaning they are 130% of the throw it away point - or down to 65% of "new". Is that "Ok" or "OMG, the thing will drop dead next week"? How sensitive are usual circuits to fading tubes.

(c) Unfortunately, the 6146A tubes that I have measure at about 98% (by my definition - i.e., they are 98% of the minimum - the HX-500 uses two 6146s). Does 98% mean that they are literally unusable? That 98% on my spreadsheet is, of course, actually about 49% of "new".

(d) What is the correct way to think about measured transconductance? 100% of the "typical" values in the RCA Manual is undoubtedly quite good - a new tube. But, what does 85% mean? 50% (i.e., what I call 100% in my spreadsheet)?

(e) How does transconductance decline over time?
Is it typically a slow linear drop or more of an
exponential decline or more of a sudden catastrophic collapse?

As always, I appreciate your thoughts and enlightenment.

Regards to the List,

Jack, W?YJ ("Friend to all Things Hammarlund")
Evergreen, Colorado USA

From k4oah at mindspring.com Thu Sep 12 12:17:16 2013
From: k4oah at mindspring.com (Garey Barrell)
Date: Thu, 12 Sep 2013 12:17:16 -0400
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <mailman.25.1378999649.206.boatanchors@theporch.com>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <5231E90C.2000101@mindspring.com>

Jack -

One opinion..... (you'll get many!)

Put the tube tester away, and plug the tubes into your radio. If it works normally, it will probably continue to work
for a long while. If it doesn't work normally, toss the tube and try another. If it STILL doesn't work normally, try
the tubes in another radio, if possible. If the second radio works, FIX the first radio! :-)

If you're bored, once you get the radio working properly, try replacing the tubes

one at a time with your 'spares'. If
you plug a 'new' tube in and the radio continues to work properly, put that tube into the 'known good' pile. If the
radio seriously degrades with the change, toss the tube.

Once done, you'll have a set of 'known good' tubes on hand. If the radio 'fails', try your known good tubes first. If
no luck, you've eliminated the tube as a problem. If it does, you had a spare and the radio is back in service!

73, Garey - K4OAH
Glen Allen, VA

Drake 2-B, 2-C/2-NT, 4-A, 4-B, C-Line
and TR-4/C Service Supplement CDs
<www.k4oah.com>

Jack Harper wrote:
> Greetings to the List -
>
> I am (slowly) restoring a Hammarlund HX-500 transmitter to life and have spent a couple of evenings carefully testing
> spare tubes on my Hickok to get the best set that I can installed into the beast.
>
> After separating out and testing 109 tubes and recording all that into a spreadsheet, I finally figured out that I am
> not very sure about exactly what I am doing.
>
> The spreadsheet is setup to record tubes at 100% if they meet the minimum transconductance specified on the Hickok
> roll chart.
>
> So, a tube that measures 3800 micro-mhos on the Hickok where the roll chart specifies a minimum of 3500 micro-mhos
> would appear on my spreadsheet as 109% (hooray!).
>
> However, that is, I think, awfully misleading as it is 109% of the "Throw it Away" point - 100% means throw it away...
>
>
> Looking tube characteristics up in the RCA Manual and comparing that to the Hickok roll charts, it seems that the
> Hickok declares tubes to be "Throw it Away" at something like 50% of the "normal" (new?) transconductance, though that
> seems to vary by tube type.
>
>

> Questions:
>
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> normal - it also varies with voltages. My faithful tube tester certainly does not measure transconductance in "triode
> mode" (grids tied together?), so it is clearly a fuzzy thing, that 50% drop dead mark.
>
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> (c) Unfortunately, the 6146A tubes that I have measure at about 98% (by my definition - i.e., they are 98% of the
> minimum - the HX-500 uses two 6146s). Does 98% mean that they are literally unusable? That 98% on my spreadsheet is,
> of course, actually about 49% of "new".
>
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> (e) How does transconductance decline over time? Is it typically a slow linear drop or more of an exponential decline
> or more of a sudden catastrophic collapse?
>
> As always, I appreciate your thoughts and enlightenment.
>
>
> Regards to the List,
>
> Jack, W?YJ ("Friend to all Things Hammarlund")
> Evergreen, Colorado USA
>

From gumbear at pacbell.net Thu Sep 12 13:32:40 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 12 Sep 2013 10:32:40 -0700
Subject: [BoatAnchors] (BA List) Tube Testing...

References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <001c01ceafde$1acf8050$4301a8c0@KB6NAX>

Hi Jack,

Here's what I think about when dealing with tube neurosis (my comments interspersed among yours):

> ....I finally figured out that I am not very sure about exactly what I am doing. .....

You are a member of the club in good standing.

> .....The spreadsheet is setup to record tubes at 100% if they meet the minimum transconductance specified on the Hickok roll chart. ..... So, a tube that measures 3800 micro-mhos on the Hickok where the roll chart specifies a minimum of 3500 micro-mhos would appear on my spreadsheet as 109% (hooray!). ......

You can save typing strokes by just typing a "1", meaning the ratio of test reading to "throw-away" value.

> ......However, that is, I think, awfully misleading as it is 109% of the "Throw it Away" point - 100% means throw it away...

So typing "1.09" means the tube is testing at 1.09 times the end of life value. This way cognitive dissonance is less of a problem.

> ....Looking tube characteristics up in the RCA Manual and comparing that to the Hickok roll charts, it seems that the Hickok declares tubes to be "Throw it Away" at something like 50% of the "normal" (new?) transconductance, though that seems to vary by tube type. ....

This is where the mind boggling begins. At any operating point of plate current the transconductance of a tube is different. So what is indicated in the tube data sheet is a "bogey tube" **specifed operating condition**. A "bogey tube" is an imaginary statistically significant tube, not even an average production value tube. It has always been a murkey issue from what I've been able to learn. Perhaps someone has a better way of defining "bogey tube."

> .....(a) In general, why does Hickok use that ~50% drop dead point? For example, I notice that transconductance seems to vary a lot - one tube specifies 3500 when "used in triode mode"; 4000 when used in another mode; and 4500 when used

normal - it also varies with voltages. ....

My best guess is the "throw-away" value is selected as a good point for periodic preventive maintenance, a compromise between the cost of replacing tubes and the cost of down time, i.e., an optimum requrement for industrial maintenance economics.

> ......My faithful tube tester certainly does not measure transconductance in "triode mode" (grids tied together?), so it is clearly a fuzzy thing, that 50% drop dead mark. ......

You are on the trail of enlightenment. A tube is a complex animal. It can be operated at many operating points depending on circuit requirements..

> ....(b) In general, what is the effect on circuit operation as transconductance drops over time. Most of the tubes that I have for the HX-500 are in the 130% range - meaning they are 130% of the throw it away point - or down to 65% of "new". Is that "Ok" or "OMG, the thing will drop dead next week"? How sensitive are usual circuits to fading tubes. ....

Now that you know tubes are mysterious you need to also know that circuit designs are too. In some circuits a tube well beyond its throw-away value still gives useful performance. On the other exteme some circuits won't operate properly with some tubes because of the wide variance in new tube characteristics (the evasive bogey tube effect). The more demands are put on a tube to operate in a circuit the more tubes will be found to not operate satisfactorily.

> .....(c) Unfortunately, the 6146A tubes that I have measure at about 98% (by my definition - i.e., they are 98% of the minimum - the HX-500 uses two 6146s). Does 98% mean that they are literally unusable? That 98% on my spreadsheet is, of course, actually about 49% of "new". ....

You are confusing the data sheet static transconductance value with the tube tester's dynamic transconductance value. Dynamic transconductance is not specified in the tube data sheet. If you want to go cerebral try this:

http://www.tubebooks.org/Books/Pullen_Conductance.pdf

> ....(d) What is the correct way to think about measured transconductance? 100% of the "typical" values in the RCA Manual is undoubtedly quite good - a new tube. But, what does 85% mean? 50% (i.e., what I call 100% in my spreadsheet)? ....

The correct way to think about transconductance is to not give it too much significance. If a tube operates satisfactorily in a circuit it is "good."

> .....(e) How does transconductance decline over time?
Is it typically a slow linear drop or more of an
exponential decline or more of a sudden catastrophic collapse? ......

In the simplest terms transconductance declines gradually. As a tube ages in use other factors that will determine its fate come into play. Under static, unvarying operating conditions, depending on what a circuit requires from a tube, performance will decrease, or function become unstable, or just stop. For example a weaker audio or IF tube means turning the gain up a bit. A power output tube may produce an unacceptabel level of distortion. An oscillator may just stop oscillating.

Other factors that determine the fate of a tube include increasing grid emission causing the operating the point to shift to an unacceptable condition. Gas from a leaky envelope can lead to catastrohic failure of the tube and damage to the circuit. Noise in the tube due to fracture of welds, debris in the tube, increasing leakage across mica wafers, heater cathode leakage or breakdown, elements arcing or shorting together. Tubes suffering from these problems may easily pass a transconductance or emission test.

The ultimate test is how the tube operates in its circuit.

Arden Allen
KB6NAX

It would be a horrible world if everything was on two legs.
-Cleveland Amory

From w7qho at aol.com Thu Sep 12 14:04:29 2013
From: w7qho at aol.com (mac)
Date: Thu, 12 Sep 2013 11:04:29 -0700
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <mailman.25.1378999649.206.boatanchors@theporch.com>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <EAE528DF-126C-4A37-8F82-290F6BC777B8@aol.com>

As Sibley points out "a tube tester is simply a guide to the usefulness of a tube. In earlier times it was a handy sales tool, a scientific-appearing device helping convince the customer that a new tube was required." (Tube Lore, 1996)

Dennis D. W7QHO
Glendale, CA

From ka6uup at comcast.net Thu Sep 12 14:27:21 2013
From: ka6uup at comcast.net (Chuck)
Date: Thu, 12 Sep 2013 11:27:21 -0700
Subject: [BoatAnchors] Antenna Rotator Email Reflector
Message-ID: <52320789.4020109@comcast.net>

Does anyone know of a email dicussion group devoted to rotators?
Tnx es 73,
Chuck KA6UUP

From wwatson5 at sbcglobal.net Thu Sep 12 15:06:35 2013
From: wwatson5 at sbcglobal.net (William Watson)
Date: Thu, 12 Sep 2013 12:06:35 -0700 (PDT)
Subject: [BoatAnchors] Looking for SX-28A RF tuning slugs
Message-ID: <1379012795.22250.YahooMailNeo@web181406.mail.ne1.yahoo.com>

I need about 6 of the threaded powdered iron RF tuning slugs for the SX-28A.
?
Any help would be greatly appreciated.? I have two of these radios on the bench
being restored.? These slugs have a habit of
not being there or being broken.
?
Thanks.
?
Joe
W5WBR

From wb3fau55 at neo.rr.com Thu Sep 12 16:09:17 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Thu, 12 Sep 2013 16:09:17 -0400
Subject: [BoatAnchors] assist with a HQ-129X
Message-ID: <20130912200917.SCTNE.1725.root@hrndva-web03-z02>

I got a Hammarlund HQ-129X I a trade. It is in remarkably good condx. I have a problem with the main and bandspread tuning. There is some backlash. Upon investigation,and disassembly, I see there are split gears on the tuning cap shafts. Do these gears need to be preloaded? Will this take care of the backlash? Russ, wb3fau...

From wb3fau55 at neo.rr.com Thu Sep 12 16:19:37 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Thu, 12 Sep 2013 16:19:37 -0400
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <20130912201938.MHQ6T.1815.root@hrndva-web03-z02>

As for the 6146s, tune up your rig, quickly take it off resonance, if the plate current does not go very high, say about 400Ma, its a good bet they are weak. 73s Russ.
---- Jack Harper <jharper at secureoutcomes.net> wrote:
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>
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> transmitter to life and have spent a couple of
> evenings carefully testing spare tubes on my
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> if they meet the minimum transconductance specified on the Hickok roll chart.
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> it is 109% of the "Throw it Away" point - 100% means throw it away...
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> seems that the Hickok declares tubes to be "Throw
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> drop dead point? For example, I notice that
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> specifies 3500 when "used in triode mode"; 4000
> when used in another mode; and 4500 when used
> normal - it also varies with voltages. My

> faithful tube tester certainly does not measure
> transconductance in "triode mode" (grids tied
> together?), so it is clearly a fuzzy thing, that 50% drop dead mark.
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> operation as transconductance drops over time.
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> week"? How sensitive are usual circuits to fading tubes.
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> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From 1oldlens1 at ix.netcom.com Thu Sep 12 16:32:59 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Thu, 12 Sep 2013 13:32:59 -0700 (GMT-07:00)
Subject: [BoatAnchors] assist with a HQ-129X
Message-ID: <4333020.1379017979773.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>

-----Original Message-----
>From: wb3fau55 at neo.rr.com
>Sent: Sep 12, 2013 1:09 PM
>To: boatanchors at theporch.com
>Subject: [BoatAnchors] assist with a HQ-129X
>
>I got a Hammarlund HQ-129X I a trade. It is in remarkably good condx. I have a problem with the main and bandspread tuning. There is some backlash. Upon investigation,and disassembly, I see there are split gears on the tuning cap
>shafts. Do these gears need to be preloaded? Will this take care of the backlash? Russ, wb3fau...

AFAIK, all split anti-backlash gears work by having a spring load on one of the gears. That gear can move independently of the other so that the two together grip the drive gear and take up any slight clearance between the teeth. The preload is not lost unless the drive gear is removed or the spring is broken or removed. Check to see that the movable gear is free to move, you may have to run some light oil into the hub between the two gears. A visual inspection will show if the spring is missing or broken but I think that is unlikely.

The HQ-129-X is a surprisingly good receiver and worth some effort to make right.

From hurstjsj at gmail.com Thu Sep 12 17:24:23 2013
From: hurstjsj at gmail.com (John Hurst)
Date: Thu, 12 Sep 2013 14:24:23 -0700
Subject: [BoatAnchors] (BA List) Tube Testing...

In-Reply-To: <001c01ceafde$1acf8050$4301a8c0@KB6NAX>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
<mailman.25.1378999649.206.boatanchors@theporch.com>
<001c01ceafde$1acf8050$4301a8c0@KB6NAX>
Message-ID: <002501ceaffe$74191d40$5c4b57c0$@com>

Thanks Arden for the link to Pullen's book. This explains where the rather peculiar resistance coupled amplifier design parameters came from in the RCA tube manuals.

Years ago I was selling a lot of (mainly) audio tubes on eBay. I usually tested the tubes with a Military TV-7D and gave the results as a fraction of the reading over the "minimum acceptable" value. To answer questions from buyers about the meaning of the numbers I'd include a simplified explanation with these paragraphs:

""A word about TV-7 tube tester readings and Hickok TT's in general. The Hickok design measures a tube's transconductance which is mainly a function of the tube's geometry (especially the average grid to cathode spacing) *and* the cathode's emission. The transconductance measurement made on new tubes can have significant differences because of production variations in the electrode spacing. These geometry variations have essentially no effect on a tube's operation. What "wears out" in a tube isn't from a change in electrode spacing but is caused by a drop in cathode emission. This is why I'll often reduce the heater (filament) voltage one notch e.g. from 6.3 to 5 volts) and observe the change in the reading. Weak tubes will almost always show a pretty radical drop. This is especially relevant for power output tubes. The output from a power tube is a function of the tube's emission and not necessarily its transconductance.

The "minimum acceptable value" (lower number) for a TV-7 test is a somewhat arbitrary value and many circuits will tolerate tubes that read well below this value. Weak output tubes in an amplifier will still work but the maximum power output will be reduced because the cathode won't allow the normal peak anode current. Again, power tubes with good emission will nearly always give their rated output power.

Rectifiers of course don't have transconductance. In this mode Hickok TT's measure just the tube's emission. Usually a new rectifier tube's reading will be only slightly above the "minimum acceptable" value. ""

A lot of TT's have a "life test" or "reserve emission" switch which lowers the heater voltage on the tube under test by something like 10%.
Over the years I've checked a lot transmitting tubes like 811's and 572B's on my TV-7. I've never seen a tube that had low power output (in a transmitter/amp) that couldn't also be detected with the "reserve emission" test.

John, KU6X

From john.shriver at gmail.com Thu Sep 12 17:29:55 2013
From: john.shriver at gmail.com (John Shriver)
Date: Thu, 12 Sep 2013 17:29:55 -0400
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <mailman.25.1378999649.206.boatanchors@theporch.com>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <CAEv8c7EqB09F4FpMamQu1=QNKNJwS5yxDm2om+onaKb=DXAcQw@mail.gmail.com>

Well, the sensitivity to transconductance depends very much on the circuit. For instance, in many of the locations in Tektronix oscilliscopes, a 6DJ8 tube can be "near death", and still work fine, since the circuit characteristics often depend entirely on the passive components, and are very insensitive to the transconductance of the tube. That's deliberate, so it stay in calibration as the tubes wear out.

On the other had, an IF amp you generally want lots of transconductance. Unless you have too much. The Dynaco FM-3 tuner will get oscillations in the IF amp if all the tubes are too "hot". (It needs more shielding.)

For power tubes like a 6146, my gut feel is that cathode emission is really what matters, not transconductance.

It all comes down to "if it works, the tube is good enough". Of course, ideally you want to be able to measure the performance of the amp.

On Wed, Sep 11, 2013 at 5:59 PM, Jack Harper <jharper at secureoutcomes.net>wrote:

> Greetings to the List -
>
> I am (slowly) restoring a Hammarlund HX-500 transmitter to life and have spent a couple of evenings carefully testing spare tubes on my Hickok to get the best set that I can installed into the beast.
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> ______________________________**_________________
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/**mailman/listinfo/boatanchors<https://minime.theporch.com/mailman/listinfo/boatanchors>
>

From a.b.bonds at Vanderbilt.Edu Thu Sep 12 17:47:04 2013
From: a.b.bonds at Vanderbilt.Edu (Bonds, A B)
Date: Thu, 12 Sep 2013 21:47:04 +0000
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <mailman.25.1378999649.206.boatanchors@theporch.com>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <C8FFB7BC5D48064D8BF9AD0086503DF9165D516A@ITS-HCWNEM103.ds.vanderbilt.edu>

Another mild inconvenience--The usual (e.g. Hickok) testers are measuring transconductance by imposing an AC signal on the grid and measuring AC on the plate at a particular bias point that is defined by the tester manufacturer. While tubes are very linear locally, the curves can go all over the place depending on the bias point. The manufacturer's spec may differ dramatically from the transconductance at the point the tube checker is testing. That being said, I am rarely disappointed with a tube that hits the green. Most circuits are not terribly dependent on transconductance, but as pointed out by many, ya gotta have emission no matter what.

Had a kid on one of my classes today who had busted off the top of a JJ 12ax7 in his guitar amp. He was antsy about "matching" the replacement tube to the other tubes in the amp. Good example of a little knowledge being a bad thing....

A. B. Bonds

-----Original Message-----
From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf Of Jack Harper
Sent: Wednesday, September 11, 2013 5:00 PM
To: boatanchors at theporch.com
Subject: [BoatAnchors] (BA List) Tube Testing...

Greetings to the List -

I am (slowly) restoring a Hammarlund HX-500 transmitter to life and have spent a couple of evenings carefully testing spare tubes on my Hickok to get the best set that I can installed into the beast.

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As always, I appreciate your thoughts and enlightenment.

Regards to the List,

Jack, W?YJ ("Friend to all Things Hammarlund")
Evergreen, Colorado USA

BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From bill at iaxs.net Thu Sep 12 18:12:05 2013
From: bill at iaxs.net (Bill Hawkins)
Date: Thu, 12 Sep 2013 17:12:05 -0500
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <002501ceaffe$74191d40$5c4b57c0$@com>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
 <001c01ceafde$1acf8050$4301a8c0@KB6NAX> <002501ceaffe$74191d40$5c4b57c0$@com>
Message-ID: <EDC48B0954C643AB95357F3F6E9501CB@system071>

Cathode emission certainly is the key. Fewer electrons, less plate current, and less power.

Remember the TV tube (CRT) rejuvenators that had a boost transformer to raise the heater voltage to get more electrons from the cathode?

Is it thoriated tungsten that actually benefits from being overheated for a while to raise emission? Doesn't work for separate heater and cathode, IIRC.

Bill Hawkins

From gumbear at pacbell.net Thu Sep 12 18:16:32 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 12 Sep 2013 15:16:32 -0700
Subject: [BoatAnchors] assist with a HQ-129X
References: <20130912200917.SCTNE.1725.root@hrndva-web03-z02>
Message-ID: <004101ceb007$4d16e9d0$4301a8c0@KB6NAX>

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shafts. Do these gears need to be preloaded? Will this take care of the backlash? Russ, wb3fau...

Yes and yes.

Ardeb

From gumbear at pacbell.net Thu Sep 12 18:14:47 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 12 Sep 2013 15:14:47 -0700
Subject: [BoatAnchors] Looking for SX-28A RF tuning slugs
References: <1379012795.22250.YahooMailNeo@web181406.mail.ne1.yahoo.com>
Message-ID: <004001ceb007$4ca451e0$4301a8c0@KB6NAX>

Broken slugs can be repaired by epoxying them back together. Clamp the slug together with enough pressure to squeeze excess epoxy out to return slug as close as possible to the original inductance producing value. For slug tuned radios it is especially important to preserve tracking as well as possible.

Arden Allen
KB6NAX

The average dog is a nicer person than
the average person. -Andy Rooney

From garygarlic at earthlink.net Thu Sep 12 18:37:41 2013
From: garygarlic at earthlink.net (Gary Woods)
Date: Thu, 12 Sep 2013 18:37:41 -0400
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <CAEv8c7EqB09F4FpMamQu1=QNKNJwS5yxDm2om+onaKb=DXAcQw@mail.gmail.com>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
 <CAEv8c7EqB09F4FpMamQu1=QNKNJwS5yxDm2om+onaKb=DXAcQw@mail.gmail.com>
Message-ID: <qgg439hcndcha63r80q3n7d9tloic86k0s@4ax.com>

On Thu, 12 Sep 2013 17:29:55 -0400, you wrote:

>For instance, in many of the locations in Tektronix
>oscilliscopes, a 6DJ8 tube can be "near death", and still work fine, since
>the circuit characteristics often depend entirely on the passive
>components,

I remember a Tek TV waveform monitor (525) that had vertical deflection tubes so bad the waveform would clip at top or bottom (I forget which). But when you moved the vertical centering to get the waveform out of clipping, the calibration was still spot on!

--

Gary Woods AKA K2AHC- PGP key on request, or at home.earthlink.net/~garygarlic
Zone 5/4 in upstate New York, 1420' elevation. NY WO G

From gumbear at pacbell.net Thu Sep 12 18:44:48 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 12 Sep 2013 15:44:48 -0700
Subject: [BoatAnchors] (BA List) Tube Testing...
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
 <001c01ceafde$1acf8050$4301a8c0@KB6NAX> <002501ceaffe$74191d40$5c4b57c0$@com>
 <EDC48B0954C643AB95357F3F6E9501CB@system071>
Message-ID: <007b01ceb00a$c6558ce0$4301a8c0@KB6NAX>

> Is it thoriated tungsten that actually benefits from being over-heated for a while to raise emission? Doesn't work for separate heater and cathode, IIRC.

Yup. By letting the tungsten filament run hotter without plate current thorium that has leached off of the surface is replaced by thorium that boils up from beneath. Only works so many time until too little thorium left.

Oxide coated cathodes will improve emission slightly by the same process but by the time poor emission becomes a problem there is little to be gained. Only increased operating temperature will give a worthy emission improvement.

Arden Allen
KB6NAX

If you pick up a starving dog and
make him prosperous, he will not
bite you. This is the principle
difference between a dog and
a man. -Mark Twain

From gumbear at pacbell.net Thu Sep 12 18:52:11 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 12 Sep 2013 15:52:11 -0700
Subject: [BoatAnchors] (BA List) Tube Testing...
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
 <CAEv8c7EqB09F4FpMamQu1=QNKNJwS5yxDm2om+onaKb=DXAcQw@mail.gmail.com>
Message-ID: <007c01ceb00a$c6c20a50$4301a8c0@KB6NAX>

> .....Well, the sensitivity to transconductance depends very much on the circuit. For instance, in many of the locations in Tektronix oscilliscopes, a 6DJ8 tube can be "near death", and still work fine, since the circuit characteristics often depend entirely on the passive components, and are very insensitive to the transconductance of the tube. That's deliberate, so it stay in calibration as the tubes wear out. ......

That's why you can replace 6DJ8's in scopes in many locations with pin for pin compatible lower transconductance types like the 6BQ7. No need to sell the kids to get "good" 6DJ8's off of the ePond.

Arden Allen
KB6NAX

If you get to thinking you're a person of
some influence, try ordering somebody
else's dog around. -Will Rogers

From kd5byb at kd5byb.net Thu Sep 12 19:13:30 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Thu, 12 Sep 2013 18:13:30 -0500
Subject: [BoatAnchors] 6DJ8's are rare??? Re: (BA List) Tube Testing...
In-Reply-To: <007c01ceb00a$c6c20a50$4301a8c0@KB6NAX>
References: <B78B8B9FF33D44599AB5BBA71E9ADC7F@DBTOA000>
 <mailman.25.1378999649.206.boatanchors@theporch.com>
 <CAEv8c7EqB09F4FpMamQu1=QNKNJwS5yxDm2om+onaKb=DXAcQw@mail.gmail.com>
 <007c01ceb00a$c6c20a50$4301a8c0@KB6NAX>
Message-ID: <52324A9A.9080606@kd5byb.net>

Wow...never knew 6DJ8's were hard to find...but after browsing around the ePlace, perhaps its time I list the several hundred used pulls I have.

About a hundred of them seem to be the "desirable" orange label Amperex's. $44 for a pair of used pull tubes? Dang.

thanks and 73,
ben, kd5byb

On 9/12/2013 5:52 PM, Arden Allen wrote:
> That's why you can replace 6DJ8's in scopes in many locations with pin for pin compatible lower transconductance types like the 6BQ7. No need to sell the kids to get "good" 6DJ8's off of the ePond.

From hankvc at lostwells.net Thu Sep 12 19:33:52 2013
From: hankvc at lostwells.net (HankVC)

Date: Thu, 12 Sep 2013 17:33:52 -0600 (MDT)
Subject: [BoatAnchors] assist with a HQ-129X
In-Reply-To: <20130912200917.SCTNE.1725.root@hrndva-web03-z02>
Message-ID: <201309122333.r8CNXq9D016208@joanne.lostwells.net>

The esteemed wb3fau55 at neo.rr.com has said:
>
> I got a Hammarlund HQ-129X I a trade. It is in remarkably good condx. I have
a problem with the main and bandspread tuning. There is some backlash. Upon
investigation,and disassembly, I see there are split gears on the tuning cap
> shafts. Do these gears need to be preloaded? Will this take care of the
backlash? Russ, wb3fau...
>
Preloaded? Yes.

Make sure the springs are in place in their windows, and that the two
gear segments are free to turn. The amount of preload should be "one
tooth of spring compression." If the gears are worn, generally you
can take them off and reposition them away from the wear spots.

Melt out any petrified lubricant. A drop of 3-in-1 or automatic
transmission oil will relubricate.

Hank

From hankvc at lostwells.net Thu Sep 12 19:49:29 2013
From: hankvc at lostwells.net (HankVC)
Date: Thu, 12 Sep 2013 17:49:29 -0600 (MDT)
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <mailman.25.1378999649.206.boatanchors@theporch.com>
Message-ID: <201309122349.r8CNnTZe016228@joanne.lostwells.net>

The esteemed Jack Harper has said:
>
> Greetings to the List -
>
> I am (slowly) restoring a Hammarlund HX-500
> transmitter to life and have spent a couple of
> evenings carefully testing spare tubes on my
> Hickok to get the best set that I can installed into the beast.
>
> After separating out and testing 109 tubes and
> recording all that into a spreadsheet, I finally
> figured out that I am not very sure about exactly what I am doing.
>
> The spreadsheet is setup to record tubes at 100%

> if they meet the minimum transconductance specified on the Hickok roll chart.
>

Jack, I think you're getting a bad case of tube-tester-itis here. If the tubes you have light up, have emission, and don't have interelectrode shorts, they'll probably work just fine in circuits.

Two places I worked---James Millen and Tektronix---if either one had any sort of tube tester on the premises, I don't remember it. If a tube lit up, and we suspected it, we did some scope-and-Simpson checking in circuit. One major defect that would bite you if you weren't aware of it was an oscillator tube that refused to oscillate. Only way I know of to pin that down is "try another tube." Interelectrode shorts in-circuit were generally pretty obvious---if they hadn't already burned out a resistor or two.

Hank

From k1lky at earthlink.net Thu Sep 12 20:26:24 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Thu, 12 Sep 2013 20:26:24 -0400
Subject: [BoatAnchors] assist with a HQ-129X
In-Reply-To: <201309122333.r8CNXq9D016208@joanne.lostwells.net>
References: <201309122333.r8CNXq9D016208@joanne.lostwells.net>
Message-ID: <1F995238-38C5-4271-89D6-77DDD84EED8A@earthlink.net>

On Sep 12, 2013, at 7:33 PM, HankVC <hankvc at lostwells.net> wrote:

> The esteemed wb3fau55 at neo.rr.com has said:
>>
>> I got a Hammarlund HQ-129X ... There is some backlash. Upon
investigation,and disassembly, I see there are split gears on the tuning cap
>> shafts. Do these gears need to be preloaded? Will this take care of the
backlash?

> Preloaded? Yes.

Hi Hank, good to see your post!

Russ, may I offer what might be clarification if you are not familiar with these gears:

Yes, preloaded (one or two teeth) and, yes, it should eliminate backlash.

> Make sure the springs are in place in their windows,

The spring sits between the two gears in a cut-out in each gear - the spring pushes one way on one gear and the other way on the other gear. This causes the teeth of the gear to "pinch" the leaf(s) of the gear they mesh with.

> and that the two gear segments are free to turn.

Free to turn with respect to each other, and not stuck together with old oil/grease.

> The amount of preload should be "one tooth of spring compression." If the gears are worn, generally you can take them off and reposition them away from the wear spots.
>
> Melt out any petrified lubricant. A drop of 3-in-1 or automatic transmission oil will relubricate.

ALL the split gears in a train need to be working right or there is likely to be backlash in the system.

If you want to dis-assemble the gear train (the best way to ensure perfect operation), I have a couple of tricks to share about getting it all back together again, with out losing a spring!

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From gumbear at pacbell.net Thu Sep 12 21:34:04 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 12 Sep 2013 18:34:04 -0700
Subject: [BoatAnchors] assist with a HQ-129X
References: <201309122333.r8CNXq9D016208@joanne.lostwells.net>
 <1F995238-38C5-4271-89D6-77DDD84EED8A@earthlink.net>
Message-ID: <001401ceb021$595cdaf0$4301a8c0@KB6NAX>

> ....ALL the split gears in a train need to be working right or there is likely to be backlash in the system.

Yes AND the eventual load to be turned must have low enough friction that the anti-backlash gear(s) operate within their tension limits, otherwise backlash will continue. If the gear train is disassembled that is the time to address all shaft turning force issues. Usually lubrication will be all that is needed.

Old varnish like grease will eventually solidify again so a complete gunk removal will ward off problems for a longer time. Of course, don't do like I did and lubricate shafts and gears with a cheap grease - I still have a couple of radios to redo.. If the shaft-bearings have a light work load a medium to light oil is all that is needed.

Arden Allen
KB6NAX

The great pleasure of a dog is that you
may make a fool of yourself with him
and not only will he not scold you,
but he will make a fool of himself too.
-Samual Butler

From k4pf at juno.com Fri Sep 13 00:01:07 2013
From: k4pf at juno.com (k4pf at juno.com)
Date: Fri, 13 Sep 2013 04:01:07 GMT
Subject: [BoatAnchors] (BA List) Tube Testing...
Message-ID: <20130913.000107.28995.0@webmail04.vgs.untd.com>

> Jack Harper <jharper at secureoutcomes.net> wrote

<snip> How sensitive are usual circuits to fading tubes.

<snip> (d) What is the correct way to think about
measured transconductance?

<snip> (e) How does transconductance decline over time?
Is it typically a slow linear drop or more of an
exponential decline or more of a sudden catastrophic collapse?

Hi, Jack

You can consider tubes to have an essentially constant mu, set at manufacture based on tube geometry, and the Gm decreases as the plate resistance increases over time (mu = Gm x Rp).

The "plate resistance" of the formula is actually mostly due to the cathode. As the cathode ages, bits of the oxide coating fall off, reducing its efficiency. If the fallen bits of oxide coating wind up at the control grid, that is bad news, causing increased grid emission (same effect as a gassy tube).

A similar process happens with thoriated tungsten filament tubes
like 811A's, as the thoria boils off the surface
of the filament, increasing the work function of the cathode surface.

The decline in cathode emission is gradual. In many circuits,
it doesn't matter much, such as voltage amplifiers,
like receiver RF and IF amplifier stages, or audio preamps.
Where it does matter is where power output is called for, such as
an audio output tube or power amplifier tube.

I think the most important use of the tube tester is the "Shorts Test."
It is very helpful to rotate your tube tester 90 degrees and repeat
the shorts test. I bought a 51S-1 receiver once, and noticed
that an IF transformer had been changed out. Sure enough,
the associated 6BA6 showed a short when the tube tester was rotated
90 degrees, although it worked fine in the receiver when operated
in the normal position.

Here's an excellent book by Bob Tomer about the practicalities
of vacuum tubes, and it includes a chapter on tube testers.
The author had a jaundiced opinion of testers, saying something like "No tube ever
had improved in performance by being subjected to a tube tester."

http://www.pmillett.com/tubebooks/Books/Atwood/
Tomer%201960%20Getting%20the%20Most%20Out%20of%20Vacuum%20Tubes.pdf

73,
Ed Knobloch

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From wb3fau55 at neo.rr.com Fri Sep 13 05:50:42 2013

From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Fri, 13 Sep 2013 5:50:42 -0400
Subject: [BoatAnchors] HQ-129X- performance
Message-ID: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>

this being a 1946 item, I see a bit less sensitivity on 10 and 15 meters. Are the 6SS7-6K8 tubes a limitation? The 6K8 tests as just acceptable.
Most of the original .05 caps are there. Real good stability on SSB sigs. I don't want to replace all those caps unless a necessity. Russ.

From gumbear at pacbell.net Fri Sep 13 07:26:33 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Fri, 13 Sep 2013 04:26:33 -0700
Subject: [BoatAnchors] HQ-129X- performance
References: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <000d01ceb074$2bc3cbf0$4301a8c0@KB6NAX>

> ....this being a 1946 item, I see a bit less sensitivity on 10 and 15 meters. Are the 6SS7-6K8 tubes a limitation? The 6K8 tests as just acceptable. ....

Russ, as you know capacitive reactance decreases as frequency increases. As well inductive reactance increases as frequency increases. Both, when represented as strays, i.e., the capacitance between conductors and ground, and the inherent inductance in a piece of wire, operate to reduce gain. Tubes got smaller as required to reduce interelectrode capacitance and lead inductance to improve gain at higher frequencies. The 6K8 and 6SS7 represent pre WW2 state of the art design but were plentiful and cheap after the war. More advanced designs of the period took advantage of the new miniature tubes (not those that were not just miniaturized old designs) that were designed for better gain at higher frequencies, such as the 6J6 and 6AK5. The demands of television for better VHF and 43 MHz IF performance produced greatly improved tube designs for the next couple of decades. Some folks have upgraded receiver performance by replacing octal tubes with better performing mniature tubes. That can be a tricky business because more gain at higher frequencies demands better circuit layouts and wiring methods to avoid instability. But it can be done. You may be able to improve your 129X by installing higher gain 6SG7's in place of one or more 6SS7's. But if you're not familiar with requirements for high freqency circuits you may want to leave things as they are and just do a good job of alignment.

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,

and make a friend forever =:-)

From johnmb at nc.rr.com Fri Sep 13 08:08:52 2013
From: johnmb at nc.rr.com (John)
Date: Fri, 13 Sep 2013 08:08:52 -0400
Subject: [BoatAnchors] HQ-129X- performance
Message-ID: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>

Good info Arden.

I found a small tube type pre selector really brought up the performance of my older gear on 10m. I think the unit I have is an RME of the early 60s variety

73
John

Arden Allen <gumbear at pacbell.net> wrote:

>> ....this being a 1946 item, I see a bit less sensitivity on 10 and 15
>meters. Are the 6SS7-6K8 tubes a limitation? The 6K8 tests as just
>acceptable. ....
>
>Russ, as you know capacitive reactance decreases as frequency increases. As
>well inductive reactance increases as frequency increases. Both, when
>represented as strays, i.e., the capacitance between conductors and ground,
>and the inherent inductance in a piece of wire, operate to reduce gain.
>Tubes got smaller as required to reduce interelectrode capacitance and lead
>inductance to improve gain at higher frequencies. The 6K8 and 6SS7
>represent pre WW2 state of the art design but were plentiful and cheap after
>the war. More advanced designs of the period took advantage of the new
>miniature tubes (not those that were not just miniaturized old designs) that
>were designed for better gain at higher frequencies, such as the 6J6 and
>6AK5. The demands of television for better VHF and 43 MHz IF performance
>produced greatly improved tube designs for the next couple of decades. Some
>folks have upgraded receiver performance by replacing octal tubes with
>better performing mniature tubes. That can be a tricky business because
>more gain at higher frequencies demands better circuit layouts and wiring
>methods to avoid instability. But it can be done. You may be able to
>improve your 129X by installing higher gain 6SG7's in place of one or more
>6SS7's. But if you're not familiar with requirements for high freqency
>circuits you may want to leave things as they are and just do a good job of
>alignment.
>
>Arden Allen
>KB6NAX
>

>Adopt a shelter dog,
>save an innocent life,
>and make a friend forever =:-)
>
>____
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

From mike at oldaudio.net Fri Sep 13 08:54:02 2013
From: mike at oldaudio.net (Mike Durff)
Date: Fri, 13 Sep 2013 05:54:02 -0700 (PDT)
Subject: [BoatAnchors] (BA List) Tube Testing...
Message-ID: <1379076842.3738.YahooMailNeo@web5702.biz.mail.ne1.yahoo.com>

Tube testers? "We don't need no stinking tube testers"

Back when I went to electronics school in the 60's, friends of the instructor would bring in their TV sets for repair. His policy was to replace ALL tubes first, before any circuit trouble-shooting. Of course, you could afford to do that as the cost was around $20 for the whole set. The "all american 5" tube set for table radios was $3.95. I remember the "Raytheon" brand being the lowest priced and lowest quality.?
One thing I remember distinctly, if the vertical wouldn't hold, it was a leaky by-pass cap on the cathode of the vertical oscillator.?
Mike

From jharper at secureoutcomes.net Thu Sep 12 20:16:52 2013
From: jharper at secureoutcomes.net (Jack Harper)
Date: Thu, 12 Sep 2013 18:16:52 -0600
Subject: [BoatAnchors] (BA List) Tube Testing...
In-Reply-To: <201309122349.r8CNnTZe016228@joanne.lostwells.net>
References: <mailman.25.1378999649.206.boatanchors@theporch.com>
 <201309122349.r8CNnTZe016228@joanne.lostwells.net>
Message-ID: <mailman.38.1379082819.350.boatanchors@theporch.com>

At 05:49 PM 9/12/2013, HankVC wrote:

><snip>
>Jack, I think you're getting a bad case of tube-tester-itis here.

Hank, well lessee according to the piece of paper
that I carry in my passport, I have been
inoculated against Hepatitis A, B, and C;
Typhoid; Shingles; Polio; Measles; Cholera;
Whooping Cough; Diphtheria; Smallpox; Pertussis;

Tetanus; Mumps; Yellow Fever; Encephalitis (I go
to some odd places in my work) - and now, I must
find a Doc to zap me against the dreaded
TubeTesterItis ("TTI") - Sigh... :)   However,
it appears that TTI might be a form of mental illness :)

I appreciate the feedback on the TTI-related (is
that like "Low-T"? :) questions that I asked -
they are extremely interesting to
read...   ...many things, as usual, that I did not know before.

What I am gathering is "Don't worry about it -
Plug the thing in and see if it works!".

However, the engineer in me bubbles up anytime I
get around something to measure; record; and
organize in a spreadsheet. Next is an Access
Database of hundreds of used tubes and their measured numbers :)

Very interesting feedback - and, as always with
the BA List, illuminating. It is remarkable how a
simple question yields a not-simple answer - as
usual, the closer you look at something, it
balloons into a universe in itself - in this case, tubes measurements...

Regards to the List;

Jack, W?YJ ("Friend to all Things Hammarlund")
Evergreen, Colorado USA

From spr at earthlink.net Thu Sep 12 13:22:26 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Thu, 12 Sep 2013 10:22:26 -0700 (GMT-07:00)
Subject: [BoatAnchors] (BA List) Tube Testing...
Message-ID: <28379199.1379006547416.JavaMail.root@wamui-june.atl.sa.earthlink.net>

Jack,

First, the Hickok tester's nominal points were set at the factory by using a
"bogie" tube, one that was determined but RCA or whoever to be just at the nominal

transconductance. If you are using the red/green scale on a Hickok, a nominal tube will sit at about 75% of full scale.

Second, the actual measured Gm depends on voltage and current. Hickoks test mots tubes at about 200V and at whatever current the bias setting yeilds. This may not be the same number that a tube manual calls out for, say, 300V and a different current.

Third, in most applications, the radio will work fine with slightly tired tubes (right at the red/green boundary). For best signal-to-noise, you might want a strong tube in the 1st RF amp, but otherwise it's not critical.

Power amp tubes will generate less than the power you expect if they are weak. For your 6146 situation, I'd measure the RF power out of the transmitter. If you're satisfied with that, those 6146s are working as you need them to.

If more questions, ask!

Regards,

Scott Robinson

-----Original Message-----
>From: Jack Harper <jharper at secureoutcomes.net>
>Sent: Sep 11, 2013 2:59 PM
>To: boatanchors at theporch.com
>Subject: [BoatAnchors] (BA List) Tube Testing...
>
>Greetings to the List -
>
>I am (slowly) restoring a Hammarlund HX-500
>transmitter to life and have spent a couple of
>evenings carefully testing spare tubes on my
>Hickok to get the best set that I can installed into the beast.
>
>After separating out and testing 109 tubes and
>recording all that into a spreadsheet, I finally
>figured out that I am not very sure about exactly what I am doing.
>
>The spreadsheet is setup to record tubes at 100%
>if they meet the minimum transconductance specified on the Hickok roll chart.
>
>So, a tube that measures 3800 micro-mhos on the
>Hickok where the roll chart specifies a minimum
>of 3500 micro-mhos would appear on my spreadsheet as 109% (hooray!).
>

>However, that is, I think, awfully misleading as
>it is 109% of the "Throw it Away" point - 100% means throw it away...
>
>
>Looking tube characteristics up in the RCA Manual
>and comparing that to the Hickok roll charts, it
>seems that the Hickok declares tubes to be "Throw
>it Away" at something like 50% of the "normal"
>(new?) transconductance, though that seems to vary by tube type.
>
>
>Questions:
>
>(a) In general, why does Hickok use that ~50%
>drop dead point? For example, I notice that
>transconductance seems to vary a lot - one tube
>specifies 3500 when "used in triode mode"; 4000
>when used in another mode; and 4500 when used
>normal - it also varies with voltages. My
>faithful tube tester certainly does not measure
>transconductance in "triode mode" (grids tied
>together?), so it is clearly a fuzzy thing, that 50% drop dead mark.
>
>(b) In general, what is the effect on circuit
>operation as transconductance drops over time.
>Most of the tubes that I have for the HX-500 are
>in the 130% range - meaning they are 130% of the
>throw it away point - or down to 65% of "new". Is
>that "Ok" or "OMG, the thing will drop dead next
>week"? How sensitive are usual circuits to fading tubes.
>
>(c) Unfortunately, the 6146A tubes that I have
>measure at about 98% (by my definition - i.e.,
>they are 98% of the minimum - the HX-500 uses two
>6146s). Does 98% mean that they are literally
>unusable? That 98% on my spreadsheet is, of
>course, actually about 49% of "new".
>
>(d) What is the correct way to think about
>measured transconductance? 100% of the "typical"
>values in the RCA Manual is undoubtedly quite
>good - a new tube. But, what does 85% mean? 50%
>(i.e., what I call 100% in my spreadsheet)?
>
>(e) How does transconductance decline over time?
>Is it typically a slow linear drop or more of an
>exponential decline or more of a sudden catastrophic collapse?
>

```
>As always, I appreciate your thoughts and enlightenment.
>
>
>Regards to the List,
>
>Jack, W?YJ ("Friend to all Things Hammarlund")
>Evergreen, Colorado USA
>
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>
>
>
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>_______________________________________________
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors
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From spr at earthlink.net  Thu Sep 12 16:27:11 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Thu, 12 Sep 2013 13:27:11 -0700 (GMT-07:00)
Subject: [BoatAnchors] assist with a HQ-129X
Message-ID: <31012083.1379017632209.JavaMail.root@wamui-june.atl.sa.earthlink.net>
```

Hi Russ,

The most likely thing that has happened is that the grease the radio was assembled with once upon a time has hardened enough so that the tow gears cannot move with respect to each other and let the spring do its work.

Spray the edges of the gears with WD-40, which will soften the grease. With a razor blade see if you can pry them apart just a little bit so that the WD-40 can get at the grease better. Let it sit for an hour or two and see if that helps.

You can test this by using a screwdriver on the teeth to move one gear in rotation with respect to the other so as to compress the spring. Once you can do this, the grease is probably soft enough for the radio to work properly.

Regards,

Scott Robinson

-----Original Message-----
>From: wb3fau55 at neo.rr.com
>Sent: Sep 12, 2013 1:09 PM
>To: boatanchors at theporch.com
>Subject: [BoatAnchors] assist with a HQ-129X
>
>I got a Hammarlund HQ-129X I a trade. It is in remarkably good condx. I have a problem with the main and bandspread tuning. There is some backlash. Upon investigation,and disassembly, I see there are split gears on the tuning cap
>shafts. Do these gears need to be preloaded? Will this take care of the backlash? Russ, wb3fau...

From listown at nanniandjack.com Fri Sep 13 10:57:43 2013
From: listown at nanniandjack.com (Jack G F Hill)
Date: Fri, 13 Sep 2013 09:57:43 -0500
Subject: [BoatAnchors] Posting courtesy (again)
Message-ID: <523327E7.301@nanniandjack.com>

Gang-

Four months ago I wrote, noting that there are some who just can NOT seem to be bothered to edit out parts of a previous post to which one is replying that have *NO* bearing whatsoever to the comment being added...

For a time, we had general awareness and helpful compliance, with a few of the continuing offenders being placed in "MODERATION"

There is a small problem with this... because the list has been around and because many posts are cross-posted to other lists and web-crawlers pick up the list address, the daily incoming SPAM has grown to large proportions... and, those moderated subscribers' posts awaiting approval go into the same pile as all the SPAM... This means once placed on moderation, your posts may get deleted if I have to miss it, or if I get lazy and just dump the whole queue in the trash.

For 21 years, this list has had the very best signal to noise ratio of any list on the Internet... and for 19 of those years Phil and I have managed the list and maintained, for the most part, that signal to noise...

The problem with over-quoting is simple - it is redundant and rude and adds no value as it adds noise to the list.

If you are willing to risk having your pearls be lost in the swill and garbage of the SPAM, stay lazy and stay rude... you WILL be moderated and potentially not have your posts reach the list... and, as I said in May, if this offends someone, please feel free to take your marbles and go fight it out with the spammers on the other lists... The rest of us are here to have FUN and be courteous to each other.
--
73, Jack Hill, W4KH - BoatAnchors Listowner/Archiver
listown at nanniandjack.com
"Plus ca change, plus c'est la meme chose"
"Il n'y a que les idiots qui ne changent jamais d'idee"

From w7qho at aol.com Fri Sep 13 11:15:06 2013
From: w7qho at aol.com (mac)
Date: Fri, 13 Sep 2013 08:15:06 -0700
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
References: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <5D5CB79E-022C-4F1F-8ACF-6A87F35263FE@aol.com>

Russ,

All things considered, the HQ-129X was a best buy for the money in it's era IMHO. Replacing the 6SS7 with a 6SG7 could buy you some improved performance on 10 & 15M as Arden said but the 6K8 triode-hexode converter was one of the noisiest in use at the time and there is no easy substitute for that tube. Outboard tuned or "xtal controlled" converters a better way to go for above 20 mHz, see handbooks, CQ, QST, etc. articles of the period for circuits.

Dennis D. W7QHO
Glendale, CA

****
On Sep 13, 2013, at 2:50 AM, <wb3fau55 at neo.rr.com>
<wb3fau55 at neo.rr.com> wrote:

> this being a 1946 item, I see a bit less sensitivity on 10 and 15
> meters. Are the 6SS7-6K8 tubes a limitation? The 6K8 tests as
> just acceptable.
> Most of the original .05 caps are there. Real good stability on SSB
> sigs. I don't want to replace all those caps unless a
> necessity. Russ.
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From ark at ar88.net Fri Sep 13 11:28:10 2013
From: ark at ar88.net (Al Klase)
Date: Fri, 13 Sep 2013 11:28:10 -0400
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
References: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <52332F0A.4030000@ar88.net>

ONE MORE TIME!

If they are paper caps, get them ALL out of there! The "good" caps aren't going to stay good.

With a receiver of this complexity, RF, Converter, and three IF's, you can have multiple things wrong, and the radio will still receive stations.

Al

On 9/13/2013 5:50 AM, wb3fau55 at neo.rr.com wrote:
> this being a 1946 item, I see a bit less sensitivity on 10 and 15 meters. Are the 6SS7-6K8 tubes a limitation? The 6K8 tests as just acceptable.
> Most of the original .05 caps are there. Real good stability on SSB sigs. I don't want to replace all those caps unless a necessity. Russ.
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

--
Al Klase - N3FRQ
Jersey City, NJ
http://www.skywaves.ar88.net/

From thompson at mindspring.com Fri Sep 13 13:41:57 2013
From: thompson at mindspring.com (David Thompson)
Date: Fri, 13 Sep 2013 13:41:57 -0400
Subject: [BoatAnchors] HQ-129X- performance
References: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <010a01ceb0a8$8ec6ca70$015e4d0c@yourxb2x7j77gn>

I have an HQ-129X that was refurbished by George W1LSB as part of a trade. Have not had a problem with backlash but agree that it does not perform as well on 10 meters as on 80 to 20.

I use a Palomar P-408 preselector on 10
that I can turn off when using say 75. I assume an RME DB23 will work as
well.

73 Dave K4JRB

From Paul.Thekan at cpii.com Fri Sep 13 14:05:59 2013
From: Paul.Thekan at cpii.com (Thekan, Paul)
Date: Fri, 13 Sep 2013 11:05:59 -0700
Subject: [BoatAnchors] Pierce PEC 120 xmtr info pls
Message-ID: <7EC59351BB5C644E80AB7A434394DFF027EA341E83@Torreypines.cpii.com>

Greetings to the group

My friend Dan , W7DR, has this transmitter made by Pierce Electronics Corp and would like to find a copy of the manual...if one even exists. It is a 120 watt hf cw/phone xmtr made around 1947. I say 1947 because the only thing I could find on this xmtr and the oufit that made it was an advertisement for it in a Dec 1947 issue of CQ. The company was located here in Santa Clara Ca. I'm guessing they maybe only sold a few and either went out of business or moved into some other line of electronic mfr.

Any info or history on this xmtr will be much appreciated

Thank you
Paul
N6FEG

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From gumbear at pacbell.net Fri Sep 13 15:11:40 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Fri, 13 Sep 2013 12:11:40 -0700

Subject: [BoatAnchors] HQ-129X- performance
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
Message-ID: <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX>

> I found a small tube type pre selector really brought up the performance of my older gear on 10m. I think the unit I have is an RME of the early 60s variety[.]

Yes, a preselector is a very good practical way to improve sensitivity above 20 MHz. Back in the pleistocene age I built from a Popular Electronics article a preselector for my Heathkit AR-3 which was almost totally deaf above 15 MHz. It utilized the pentode section of a 6AS8 TV IF amp tube for the amp and the diode for the B+ rectifier. I rebuilt it three times before I learned how to make it give me full gain without oscillating. I once tried it on a modern SS rig to see how it may have degraded the s/n ratio. It didn't! Worth considering for your HQ-129X, Russ.

Arden Allen
KB6NAX

I love a dog. He does nothing for political reasons.
-Will Rogers

From 1oldlens1 at ix.netcom.com Fri Sep 13 15:40:35 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Fri, 13 Sep 2013 12:40:35 -0700 (GMT-07:00)
Subject: [BoatAnchors] HQ-129X- performance
Message-ID: <25163281.1379101235906.JavaMail.root@mswamui-backed.atl.sa.earthlink.net>

-----Original Message-----
>From: Arden Allen <gumbear at pacbell.net>
>Sent: Sep 13, 2013 12:11 PM
>To: John <johnmb at nc.rr.com>
>Cc: boatanchors at theporch.com
>Subject: Re: [BoatAnchors] HQ-129X- performance
>
>> I found a small tube type pre selector really brought up the performance
>of my older gear on 10m. I think the unit I have is an RME of the early 60s
>variety[.]
>
>Yes, a preselector is a very good practical way to improve sensitivity above
>20 MHz. Back in the pleistocene age I built from a Popular Electronics

>article a preselector for my Heathkit AR-3 which was almost totally deaf
>above 15 MHz. It utilized the pentode section of a 6AS8 TV IF amp tube for
>the amp and the diode for the B+ rectifier. I rebuilt it three times before
>I learned how to make it give me full gain without oscillating. I once
>tried it on a modern SS rig to see how it may have degraded the s/n ratio.
>It didn't! Worth considering for your HQ-129X, Russ.
>
>Arden Allen
>KB6NAX
>
>I love a dog. He does nothing for political reasons.
>-Will Rogers
>

I think the problem with the HQ-129-X is a combination of losses in the RF coils and less a less than optimum RF section. A preselector will help but I think there is more to be gained by building a converter so that the higher frequencies can be received at some lower frequency, say 7 mhz, where performance is good. This has the advantage of very considerably improving image rejection as well as improving signal to noise and stability.

I probably measured the SNR of my HQ-129-X but no longer remember what I got. My receiver has developed some spurious responses so I will have to replace the paper caps in it. It worked pretty well and I had another project so just left it alone. Now it needs a complete re-do.

BTW, I am not a fan of simply jacking a "better" tube into a set. Sometimes this can be done with good results but its often necessary to change the screen voltages and a higher gain tube may give you problems with instability. It will also often upset the AVC circuit.

The HQ-129-X is not too difficult to work on although some of the caps are burried a bit. My experience generally is that replacing paper caps with modern film caps makes a big difference. The new caps are better than the old ones were when they were new.

From kb8tad at gmail.com Fri Sep 13 16:17:50 2013
From: kb8tad at gmail.com (Rich Post)
Date: Fri, 13 Sep 2013 16:17:50 -0400
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
References: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <CAEJr0Fu2esZdSb1V=wQ-d2yV2q8aj7rO9SaGaeW1bgdFju87_A@mail.gmail.com>

In my latest HQ-129X, I replaced all the 0.02 caps because most are in high voltage locations such as screen bypass. Most of the 0.05 caps are used in low voltage, low impedance locations such as cathode bypass where leakage of a couple of megohms will not be a problem Your mileage will vary. I prefer to check to see "what's it doing" before wholesale replacement.

Here's my saga with my most recent HQ-129X.

<http://www.ohio.edu/people/postr/bapix/HQ129.html>

73 de Rich KB8TAD

On Fri, Sep 13, 2013 at 5:50 AM, <wb3fau55 at neo.rr.com> wrote:

>
> Most of the original .05 caps are there. .... I don't want to replace
> all those caps unless a necessity. Russ

From a.b.bonds at Vanderbilt.Edu Fri Sep 13 18:08:00 2013
From: a.b.bonds at Vanderbilt.Edu (Bonds, A B)
Date: Fri, 13 Sep 2013 22:08:00 +0000
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <25163281.1379101235906.JavaMail.root@mswamui-backed.atl.sa.earthlink.net>
References: <25163281.1379101235906.JavaMail.root@mswamui-backed.atl.sa.earthlink.net>
Message-ID: <C8FFB7BC5D48064D8BF9AD0086503DF9165D54B4@ITS-HCWNEM103.ds.vanderbilt.edu>

Another important reason for replacing the papers is that they are used as bypasses for the screens. When the paper starts leaking the screen voltage drops and you start burning up resistors.

The HQ-129X is very easy to work on, don't put this off. It will reward you for the effort.

A. B. Bonds

____
From: BoatAnchors [boatanchors-bounces at theporch.com] on behalf of Richard Knoppow [1oldlens1 at ix.netcom.com]
Sent: Friday, September 13, 2013 2:40 PM
To: Arden Allen; John
Cc: boatanchors at theporch.com
Subject: Re: [BoatAnchors] HQ-129X- performance

-----Original Message-----
>From: Arden Allen <gumbear at pacbell.net>
>Sent: Sep 13, 2013 12:11 PM
>To: John <johnmb at nc.rr.com>
>Cc: boatanchors at theporch.com
>Subject: Re: [BoatAnchors] HQ-129X- performance
>

>> I found a small tube type pre selector really brought up the performance
>of my older gear on 10m. I think the unit I have is an RME of the early 60s
>variety[.]
>
>Yes, a preselector is a very good practical way to improve sensitivity above
>20 MHz. Back in the pleistocene age I built from a Popular Electronics
>article a preselector for my Heathkit AR-3 which was almost totally deaf
>above 15 MHz. It utilized the pentode section of a 6AS8 TV IF amp tube for
>the amp and the diode for the B+ rectifier. I rebuilt it three times before
>I learned how to make it give me full gain without oscillating. I once
>tried it on a modern SS rig to see how it may have degraded the s/n ratio.
>It didn't! Worth considering for your HQ-129X, Russ.
>
>Arden Allen
>KB6NAX
>
>I love a dog. He does nothing for political reasons.
>-Will Rogers
>

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BTW, I am not a fan of simply jacking a "better" tube into a set. Sometimes this can be done with good results but its often necessary to change the screen voltages and a higher gain tube may give you problems with instability. It will also often upset the AVC circuit.

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BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From wb3fau55 at neo.rr.com Fri Sep 13 18:15:51 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Fri, 13 Sep 2013 18:15:51 -0400

Subject: [BoatAnchors] HQ-129X-thanks
Message-ID: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>

I have had a few of these over a period of 20 years. This unit seems to have been stored in a dry place. It works a lot better than the others I had. Thanks for your input. I will not likely try to reinvent the wheel with this project. I have a lot of other cool receivers that work better on 10m.
Recently purchased a Drake SPR-4 from an estate. That is a real hot performer.
73s Russ.

From rbsingl at ilstu.edu Fri Sep 13 21:00:01 2013
From: rbsingl at ilstu.edu (Singley, Rodger)
Date: Sat, 14 Sep 2013 01:00:01 +0000
Subject: [BoatAnchors] HQ-129X-thanks
In-Reply-To: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
Message-ID: <0DEBF1C8D8437248BE53CD4213B89BD322F0D4F5@ISUEMBX02.ad.ilstu.edu>

Russ,

For the most part I keep my vintage rigs true to factory original since I like them to perform as they did when they were designed. I do make any changes necessary for safety (like putting a safety cover over the exposed HV binding posts on the back of my Hallicrafters HT-19 transmitter) and I add fuses to rigs that don't come so equipped but those are installed without adding additional holes. On the other hand a rig that is already modified and hacked beyond reasonable restoration can make an interesting test bed for future experiments. I picked up what started out as a Collins 75A-2 for $50 on ebay last year. It still has the Collins PTO, chassis, cabinet, and a few other parts but it is mostly Frankenstein's radio. I bought it because it came with 6 nice Tyco IF filters providing two bandwidths each on AM, SSB, and CW. The radio was being converted to solid state and came without any sort of documentation or explanation. Carefully adjusting a couple of trimmer pots brought the receiver to life and when it works it works well but the HFO is very touchy. When I have more time I will decide whether to follow my original plan and part it out for the filters or try to figure out what the previous owner was doing before he became a SK. A badly hacked up HQ-170 will provide the parts to make a "counterfeit" HC-10 SSB adapter to go with my SP-600.

A preselector will definitely pep up some of the older rigs and in many cases you are better off going with a converter for 10 and 15 which will move these down to a lower range which will provide increased sensitivity, better image rejection, and improved stability simultaneously. But if like many of us you have other rigs that are better suited to a certain range then you don't have to be able to work weak signals on 10 meters with every radio.

The SPR-4 is a nice receiver and my only criticism is I wished it retained the

passband tuning feature of the other R-4 series receivers. I recently picked up a
RR-1 which is the SPR-4 rack mounted with minor modifications for use in ocean
going vessels and it is a nice lightweight "boat anchor".

Rodger WQ9E

Dr. Rodger B. Singley
Professor of Marketing

> -----Original Message-----
> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
> Of wb3fau55 at neo.rr.com
> Sent: Friday, September 13, 2013 5:16 PM
> To: boatanchors at theporch.com
> Subject: [BoatAnchors] HQ-129X-thanks
>
> I have had a few of these over a period of 20 years. This unit seems
> to have been stored in a dry place. It works a lot better than the
> others I had. Thanks for your input. I will not likely try to
> reinvent the wheel with this project. I have a lot of other cool
> receivers that work better on 10m.
>   Recently purchased a Drake SPR-4 from an estate. That is a real hot
> performer. 73s Russ.
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From gumbear at pacbell.net Fri Sep 13 22:55:43 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Fri, 13 Sep 2013 19:55:43 -0700
Subject: [BoatAnchors] HQ-129X- performance
References: <25163281.1379101235906.JavaMail.root@mswamui-backed.atl.sa.earthlink.net>
Message-ID: <002301ceb0f9$fe186540$4301a8c0@KB6NAX>

> .....I think the problem with the HQ-129-X is a combination of losses in
the RF coils and less a less than optimum RF section. A preselector will
help but I think there is more to be gained by building a converter so that
the higher frequencies can be received at some lower frequency, say 7 mhz,
where performance is good. This has the advantage of very considerably
improving image rejection as well as improving signal to noise and
stability. ....

Hi Rich - Agreed on all counts. A converter is not much more of a project than a preselector. And the improvement in image rejection will be well appreciated when you no longer hear images on top of the weak signal you are trying to copy. Experimenting with design changes must be done in small steps so that the problems that arise can be understood and addressed. Too many chabnges at once will produce calamity.

Arden Allen
KB6NAX

Blessed is the person who has earned the love of an old dog.
- Sydney Jeanne Seward

From spr at earthlink.net Fri Sep 13 10:41:12 2013
From: spr at earthlink.net (Scott Robinson)
Date: Fri, 13 Sep 2013 07:41:12 -0700
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
References: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <52332408.3090502@earthlink.net>

Hi Russ,

Check that all screen voltages are as they should be. In the front end, that's one of the main hazards of old caps; if screen V is OK, you can leave 'em be. T'other place is the AVC bypasses.

The one exception I have made to replacing all caps is the front end of my SX-28. You have to take half the radio apart to get at 'em, and since they passed the above test, I have left them until something goes wrong.

Happy filamentarious listening,

/scott

On 9/13/13 2:50 AM, wb3fau55 at neo.rr.com wrote:
> this being a 1946 item, I see a bit less sensitivity on 10 and 15 meters. Are the 6SS7-6K8 tubes a limitation? The 6K8 tests as just acceptable.
> Most of the original .05 caps are there. Real good stability on SSB sigs. I don't want to replace all those caps unless a necessity. Russ.
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From spr at earthlink.net Fri Sep 13 15:48:54 2013
From: spr at earthlink.net (Scott Robinson)
Date: Fri, 13 Sep 2013 12:48:54 -0700
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX>
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
 <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX>
Message-ID: <52336C26.9060403@earthlink.net>

I have one of the MFJ cascode nuvistor preselectors, and its noise floor is about 800 nanovolts, which is very good indeed. You can find them on eBay for less than fifty bucks.

Regards,

Scott

From kd5byb at kd5byb.net Sat Sep 14 11:04:13 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sat, 14 Sep 2013 10:04:13 -0500
Subject: [BoatAnchors] MFJ Nuvistor Preselectors,
     was Re: HQ-129X- performance
In-Reply-To: <52336C26.9060403@earthlink.net>
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
 <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX> <52336C26.9060403@earthlink.net>
Message-ID: <52347AED.30305@kd5byb.net>

Hi Scott,

So I immediate cruised over to the e-place to take a look-see. Couldn't figure out which might be the cascode nuvistor models - got a model number by chance?

thanks much and 73,
ben, kd5byb

On 9/13/2013 2:48 PM, Scott Robinson wrote:
> I have one of the MFJ cascode nuvistor preselectors, and its noise floor
> is about 800 nanovolts, which is very good indeed. You can find them on
> eBay for less than fifty bucks.

From rbsingl at ilstu.edu Sat Sep 14 11:50:46 2013
From: rbsingl at ilstu.edu (Singley, Rodger)
Date: Sat, 14 Sep 2013 15:50:46 +0000
Subject: [BoatAnchors] MFJ Nuvistor Preselectors,

was Re: HQ-129X- performance
In-Reply-To: <52347AED.30305@kd5byb.net>
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
<002c01ceb0b6$b93e3000$4301a8c0@KB6NAX> <52336C26.9060403@earthlink.net>
<52347AED.30305@kd5byb.net>
Message-ID: <0DEBF1C8D8437248BE53CD4213B89BD322F0D680@ISUEMBX02.ad.ilstu.edu>

Are you maybe thinking about the Ameco preamplifiers with nuvistors? I think by the time MFJ was born Nuvistors were already commercially obsolete.

Rodger WQ9E

Dr. Rodger B. Singley
Professor of Marketing

> -----Original Message-----
> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
> Of Ben Hall
> Sent: Saturday, September 14, 2013 10:04 AM
> To: Scott Robinson
> Cc: boatanchors at theporch.com
> Subject: [BoatAnchors] MFJ Nuvistor Preselectors, was Re: HQ-129X-
> performance
>
> Hi Scott,
>
> So I immediate cruised over to the e-place to take a look-see.
> Couldn't figure out which might be the cascode nuvistor models - got a
> model number by chance?
>
> thanks much and 73,
> ben, kd5byb
>

From hankvc at lostwells.net Sat Sep 14 12:41:15 2013
From: hankvc at lostwells.net (HankVC)
Date: Sat, 14 Sep 2013 10:41:15 -0600 (MDT)
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <20130913095043.XP1NO.4683.root@hrndva-web03-z02>
Message-ID: <201309141641.r8EGfFkB017206@joanne.lostwells.net>

The esteemed wb3fau55 at neo.rr.com has said:
>
> this being a 1946 item, I see a bit less sensitivity on 10 and 15 meters. Are
the 6SS7-6K8 tubes a limitation? The 6K8 tests as just acceptable.

> Most of the original .05 caps are there. Real good stability on SSB sigs. I don't want to replace all those caps unless a necessity. Russ.
>

Performance fall-off below 20m on a general coverage 500kc/30mc receiver of the forties is pretty much "to be expected." There are several reasons for this, with tube performance being one.

RCA came up with the 6K8 as a single-tube oscillator/converter to overcome the dismal performance of the 6A7/6A8 at 18-20mhz. From a designer's perspective, moving from 6A8 to 6K8 was an easy switch, requiring very little redesign. The advantage of the 6K8 over the 6A8 was the inclusion of a separate local oscillator triode inside the single bulb. The later 6SA7 returned the LO function to the converter section, but replacing a 6A8 with a 6SA7 requires some fairly significant redesign in the LO circuit.

Those who care to can look at the Hallicrafters S-20R setup, and compare it with the redesign done for the S-40. Halligan employed good engineers to come up with good designs, and the schematics show fairly clearly what could be done with a prewar design to beef it up for the postwar market.

>From a design perspective, you can look at Langford Smith's discussions on frequency conversion in both the 3rd and 4th editions of "Radiotron Designer's Handbook." While his focus is primarily on home entertainment receivers, his treatment of the subject is fairly comprehensive. I think it should become clear that a design tailored for MW broadcast and 160/80 meters is "pushing the envelope" below 20 meters in many respects.

Some major considerations (beyond tube performance):

LC ratios in tuned circuits. 10 meter performance wants considerably more L and less C than 160 meters.
IF frequency selection. You need a much higher IF frequency for image rejection at 10 meters than at 160. Millen and National both marketed 1600kc IF transformers, but getting suitable narrow bandpass for ham use more-or-less demands double conversion.
Use of separate LO and mixer tubes for frequency conversion.

I think it obvious that to get good performance at 15, 10, and 6 meters requires a fresh design.

Hank

```
From k1lky at earthlink.net  Sat Sep 14 12:51:35 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Sat, 14 Sep 2013 12:51:35 -0400
Subject: [BoatAnchors] MFJ Nuvistor Preselectors,
     was Re:  HQ-129X-  performance
In-Reply-To: <0DEBF1C8D8437248BE53CD4213B89BD322F0D680@ISUEMBX02.ad.ilstu.edu>
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
 <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX> <52336C26.9060403@earthlink.net>
 <52347AED.30305@kd5byb.net>
 <0DEBF1C8D8437248BE53CD4213B89BD322F0D680@ISUEMBX02.ad.ilstu.edu>
Message-ID: <9B41DD06-91C0-4D92-BDDE-2BC5BF1EE6CC@earthlink.net>
```

On Sep 14, 2013, at 11:50 AM, "Singley, Rodger" <rbsingl at ilstu.edu> wrote:

> Are you maybe thinking about the Ameco preamplifiers with nuvistors?

I have info (schematic and instruction sheet) for the "Ameco PCL-P All Band Preamplifier".

This uses two 6CW4 or 6DS4 nuvistors, is bandswitched and has a single section tuning capacitor. There is no date on the two pages I have.

If anyone has one of these (or two) for sale, do let us know - I have plenty of receivers that could use one.

'Glad to send my documents to anyone asking for them.

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

```
From 1oldlens1 at ix.netcom.com  Sat Sep 14 12:59:50 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sat, 14 Sep 2013 09:59:50 -0700
Subject: [BoatAnchors] HQ-129X-  performance
References: <201309141641.r8EGfFkB017206@joanne.lostwells.net>
```

Message-ID: <849B1C5E776C495AA2F1CDD04FE70C74@VALUED20606295>

----- Original Message -----
From: "HankVC" <hankvc at lostwells.net>
To: <wb3fau55 at neo.rr.com>
Cc: <boatanchors at theporch.com>
Sent: Saturday, September 14, 2013 9:41 AM
Subject: Re: [BoatAnchors] HQ-129X- performance

> The esteemed wb3fau55 at neo.rr.com has said:
>>
>> this being a 1946 item, I see a bit less sensitivity on
>> 10 and 15 meters. Are the 6SS7-6K8 tubes a limitation?
>> The 6K8 tests as just acceptable.
>> Most of the original .05 caps are there. Real good
>> stability on SSB sigs. I don't want to replace all
>> those caps unless a necessity. Russ.
>>
>
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> 18-20mhz. From a
> designer's perspective, moving from 6A8 to 6K8 was an easy
> switch,
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> single bulb. The later 6SA7 returned the LO function to
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> significant redesign in the LO circuit.
>
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> setup, and
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> employed
> good engineers to come up with good designs, and the

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> beef it up
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>
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> Smith's
> discussions on frequency conversion in both the 3rd and
> 4th editions
> of "Radiotron Designer's Handbook." While his focus is
> primarily on
> home entertainment receivers, his treatment of the subject
> is fairly
> comprehensive. I think it should become clear that a
> design tailored
> for MW broadcast and 160/80 meters is "pushing the
> envelope" below 20
> meters in many respects.
>
> Some major considerations (beyond tube performance):
>
> LC ratios in tuned circuits. 10 meter performance wants
> considerably
> more L and less C than 160 meters.
> IF frequency selection. You need a much higher IF
> frequency for image
> rejection at 10 meters than at 160. Millen and National
> both marketed
> 1600kc IF transformers, but getting suitable narrow
> bandpass for ham
> use more-or-less demands double conversion.
> Use of separate LO and mixer tubes for frequency
> conversion.
>
> I think it obvious that to get good performance at 15, 10,
> and 6
> meters requires a fresh design.
>
> Hank
>

I add only that the quality of the coils in the RF section are very important. RCA used polystrene formers for the high band coils in the AR-88. I've measured a couple and the Q was about 200 at 30 mhz. This is pretty good. The formers in many receivers are Bakelite and there are probably differences in the core materials. RCA also had the benefit of the latest tubes in the AR-88 design with the 6SG7 and 6SA7. While the 6SA7 is a noisy converter its gain stays up pretty well at higher frequencies. Of course the AR-88 uses a separate oscillator which also helps.

It has not been mentioned that the HQ-129-X LO is set _below_ the signal frequency on the highest band (I think possibly on the two highest bands). Its easy to get on the wrong side which will have a definite effect on tracking and calibration. Neither the HQ-129-X or HQ-120-X book mention this but it in the HQ-140-X book.

Another thing about raising the IF frequency is that as long as the receiver is single conversion there will be a gap in the coverage at the IF frequency. Its possible to get around this with double conversion but then you have all the extra problems with spurious responses, etc. I think Hallicrafters made a couple of receivers with about 1600khz IF's and had a gap in coverage just above the broadcast band around the IF frequency.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From 1oldlens1 at ix.netcom.com Sat Sep 14 13:09:12 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sat, 14 Sep 2013 10:09:12 -0700
Subject: [BoatAnchors] HQ-129X-thanks
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
Message-ID: <771B6054226B4361B365770C01DD7E1F@VALUED20606295>

----- Original Message -----
From: <wb3fau55 at neo.rr.com>
To: <boatanchors at theporch.com>
Sent: Friday, September 13, 2013 3:15 PM
Subject: [BoatAnchors] HQ-129X-thanks

>I have had a few of these over a period of 20 years. This
>unit seems to have been stored in a dry place. It works a
>lot better than the others I had. Thanks for your input.
>I will not likely try to reinvent the wheel with this
>project. I have a lot of other cool receivers that
>work better on 10m.
> Recently purchased a Drake SPR-4 from an estate. That

> is a real hot performer. 73s Russ.

I think I would bite the bullet and just replace all the paper caps. My HQ-129-X has molded plastic caps, certainly original. I lifted and tested a couple with a bridge but that did not measure leakage. The chassis looked so clean I decided to just leave them alone but I am beginning to have failures so think its best to just dump them all. If yours are the wax covered paper kind I would certainly replace them. There are only a couple of places where the caps are hard to get at. The problem with old paper caps is that the degradation is so slow that you may not be aware of the effect on performance until you get some sort of failure. Paper caps seem to have always had a life limit. Partly it varies with the voltage on the cap versus the rated voltage, that is, the lower the voltage on the cap the longer they will last. The effect is evidently some sort of electro-chemical change in the paper itself. Later caps used plastic impregnated paper which was supposed to yield longer life and maybe did with the exception of the notorious Black Beauty caps but I think those were defective in manufacture. Nonetheless all the old molded plastic or plastic impregnated caps I've checked for leakage had a lot regardless of brand.

Modern plastic dielectric caps have vanishingly small leakage, very low ESR, and probably unlimited liftetime. They also work well at reasonably high RF frequencies, certainly better than the original caps.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From k1lky at earthlink.net Sat Sep 14 13:14:56 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Sat, 14 Sep 2013 13:14:56 -0400
Subject: [BoatAnchors] MFJ Nuvistor Preselectors,
     was Re: HQ-129X- performance
In-Reply-To: <9B41DD06-91C0-4D92-BDDE-2BC5BF1EE6CC@earthlink.net>
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
 <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX> <52336C26.9060403@earthlink.net>
 <52347AED.30305@kd5byb.net>

 <0DEBF1C8D8437248BE53CD4213B89BD322F0D680@ISUEMBX02.ad.ilstu.edu>
 <9B41DD06-91C0-4D92-BDDE-2BC5BF1EE6CC@earthlink.net>
Message-ID: <2CD62E3F-2192-429F-88B9-839FAE01AD59@earthlink.net>

On Sep 14, 2013, at 12:51 PM, Roy Morgan <k1lky at earthlink.net> wrote:
> I have info (schematic and instruction sheet) for the "Ameco PCL-P All Band Preamplifier".
>
> This uses two 6CW4 or 6DS4 nuvistors, is bandswitched

I discovered that I also have info on other of their preamps:

PV-PH:
  PV: any amateur band 50, 144 or 220 mc, 6CW4 nuvistor
  PH: any frequency 2 to 49 mc, 6DB6 tube

PT-2 solid state, internally powered, switches pre amp in and out when transmitting.

PT-3 Solid state with IC, externally powered (12 v.) switches preamp in and out when transmitting.

Glad to send info on these by email also.

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From gumbear at pacbell.net Sat Sep 14 17:08:04 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 14 Sep 2013 14:08:04 -0700
Subject: [BoatAnchors] HQ-129X-thanks
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
Message-ID: <00c001ceb18e$84206130$4301a8c0@KB6NAX>

> ......The effect is evidently some sort of electro-chemical change in the paper itself. ....

This reminds me, has anyone heard from Barry Ornitz lately?

Barry, some time ago, gave a good explanation of the problems with aged paper caps. What I remember is that the constituents in paper when subjected to moisture produce an acid that is responsible for the increasing leakage. The only paper caps that could avoid the problem were the metal glass button hermetically sealed types like Sprague's Vitamin Q line. All other capacitor encapsulation types are not impervious to moisture ingress. Plastics are hygroscopic, wax develops cracks, unglazed ceramic harbors moisture, etc.

Now about the slam on "black beauty" capacitors. The longevity of capacitors encapsulated in plastic molds is not based on the outer mold but in the materials in the dielectric. Sprague, and others, had different quality level technologies. Their better series caps are still doing well after 50 years as Tektronix scopes made then will give testament too. Consumer grade caps were aimed at the throwaway product market and were made as cheaply as possible, doubtlessly. So the proof is in the dielecric pudding when it comes to ancient capacitors.

Arden Allen
KB6NAX

It would be a horrible world if everything was on two legs.
-Cleveland Amory

From hbreuer at debitel.net Sat Sep 14 17:47:28 2013
From: hbreuer at debitel.net (Heinz Breuer)
Date: Sat, 14 Sep 2013 23:47:28 +0200
Subject: [BoatAnchors] VLF receiver
References: <911B4DDC-0EE4-4C72-A0BB-79C5A236E44B@debitel.net>
Message-ID: <11333D4C-B8D3-4BDB-9C6F-171A538E05CA@debitel.net>

Hello,
this morning I visited the radio swapmeet at Marzaglia, Italy near Modena.
I came accross a really nice receiver which looked similar to a Hammarlund SP600
but it said 'DERO RESEARCH AND DEVELOPMENT CORP. Model 2F VLF Receiver'
It was in pristine condition. Asking price was $750 (EUR 550).
Unfortunately I didn't buy it outright and when I came back at noon it was sold.
In fact it sold for less than my early morning offer. Sigh ...

I would appreciate any info about it and why it didn't say Hammarlund.

BTW if you are into old radios and ever come to Italy in May and September don't miss the 'Mercantino di Marzaglia'. The swapmeet is organized by the 'ARI Modena' the hamradio club of Modena and takes place on the second Saturday in May and September.

It is by far the biggest event especially for old broadcast radios and boatanchors as well. There were literally hundreds of pre WW II radios also lots of hamradio boatanchors.

vy 73 Heinz DH2FA, KM5VT

Von meinem iPhone gesendet

From hurstjsj at gmail.com Sat Sep 14 18:27:38 2013
From: hurstjsj at gmail.com (John Hurst)
Date: Sat, 14 Sep 2013 15:27:38 -0700
Subject: [BoatAnchors] HQ-129X-thanks
In-Reply-To: <00c001ceb18e$84206130$4301a8c0@KB6NAX>
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
 <00c001ceb18e$84206130$4301a8c0@KB6NAX>
Message-ID: <074601ceb199$9ee95ed0$dcbc1c70$@com>

I recently worked on an NC-125 with strange symptoms. I measured about -0.7 V on the AVC line even with the power off. It turns out that all of the AVC bypass caps were behaving like little batteries. With a 10 Meg VTVM they measured anywhere from 0.1 to 0.9 Volts when out of the circuit. On one of these caps the voltage actually increased (over a few seconds) when I connected the voltmeter. The polarity of the voltages on the caps were identical (the same as the AVC voltage). These were all Aerovox 0.01uF wax units.
 I also replaced all of the other bypass and coupling caps. Several of these also acted like little batteries but with a lower voltage. I mentioned this to some friends and two (out of maybe 20) of them had seen the same thing over the years.

John, KU6X

-----Original Message-----
From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf Of Arden Allen
Sent: Saturday, September 14, 2013 2:08 PM
To: Richard Knoppow; wb3fau55 at neo.rr.com; boatanchors at theporch.com
Subject: Re: [BoatAnchors] HQ-129X-thanks

> ......The effect is evidently some sort of electro-chemical change in the paper itself. ....

This reminds me, has anyone heard from Barry Ornitz lately?

Barry, some time ago, gave a good explanation of the problems with aged paper caps. What I remember is that the constituents in paper when subjected to moisture produce an acid that is responsible for the increasing leakage. The only paper caps that could avoid the problem were the metal glass button hermetically sealed types like Sprague's Vitamin Q line. All other capacitor encapsulation types are not impervious to moisture ingress. Plastics are hygroscopic, wax develops cracks, unglazed ceramic harbors moisture, etc.

Now about the slam on "black beauty" capacitors. The longevity of capacitors encapsulated in plastic molds is not based on the outer mold but in the materials in the dielectric. Sprague, and others, had different quality level technologies. Their better series caps are still doing well after 50 years as Tektronix scopes made then will give testament too. Consumer grade caps were aimed at the throwaway product market and were made as cheaply as possible, doubtlessly. So the proof is in the dielecric pudding when it comes to ancient capacitors.

Arden Allen
KB6NAX

It would be a horrible world if everything was on two legs.
-Cleveland Amory

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From 1oldlens1 at ix.netcom.com Sat Sep 14 19:02:59 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sat, 14 Sep 2013 16:02:59 -0700
Subject: [BoatAnchors] HQ-129X-thanks
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
 <00c001ceb18e$84206130$4301a8c0@KB6NAX>
Message-ID: <15C73E5EA61F452DAACB56441055B5EB@VALUED20606295>

----- Original Message -----
From: "Arden Allen" <gumbear at pacbell.net>
To: "Richard Knoppow" <1oldlens1 at ix.netcom.com>;
<wb3fau55 at neo.rr.com>; <boatanchors at theporch.com>
Sent: Saturday, September 14, 2013 2:08 PM
Subject: Re: [BoatAnchors] HQ-129X-thanks

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>> electro-chemical change in the
> paper itself. ....
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> leakage. The only paper caps that could avoid the problem
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> glass button hermetically sealed types like Sprague's
> Vitamin Q line. All
> other capacitor encapsulation types are not impervious to
> moisture ingress.
> Plastics are hygroscopic, wax develops cracks, unglazed
> ceramic harbors
> moisture, etc.
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> market and were made
> as cheaply as possible, doubtlessly. So the proof is in
> the dielecric
> pudding when it comes to ancient capacitors.
>
> Arden Allen
> KB6NAX
>

Barry wrote some interesting stuff. At the time BB caps came out there were a number of other caps with similar construction, that is, plastic impregnated paper dielectric. There appears to have been a special problem with the original BB caps which caused very early failure, not the normal long-term degradation. The original caps were filled with oil. The filling was done by means of making one lead a small tube. After filling a wire lead was soldered into the tube to seal it. If the lead was overheated in installation the seal would break and the oil leak out.

The quality of paper caps does indeed seem to be highly variable. For instance, in my recently rebuilt AR-88 the bathtub caps had all developed bad seals and leaked transformer oil all over. Nonetheless, the caps still measured reasonably good. Of course I replaced them anyway. The receiver also had a number of flat paper caps made by Micamold and Solar. I found them all to have quite high leakage and replaced them. Dissection showed similar construction. Plastic impregnated paper dielectric wound into a flat package. There was no distortion of the windings. I think these were probably quite high performance caps when new. The BB caps I've dissected all had badly distorted windings. I am assuming they were not mashed in manufacture to adjust the value.

My AR-88 also has a large, triple filter cap which is also oil-filled paper. It still works fine after probably sixty-five years.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From 1oldlens1 at ix.netcom.com Sat Sep 14 19:04:09 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sat, 14 Sep 2013 16:04:09 -0700
Subject: [BoatAnchors] HQ-129X-thanks
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
 <00c001ceb18e$84206130$4301a8c0@KB6NAX> <074601ceb199$9ee95ed0$dcbc1c70$@com>
Message-ID: <DB1777BF19154D59939D07B2FC6B3E59@VALUED20606295>

----- Original Message -----
From: "John Hurst" <hurstjsj at gmail.com>
To: <boatanchors at theporch.com>
Sent: Saturday, September 14, 2013 3:27 PM
Subject: Re: [BoatAnchors] HQ-129X-thanks

>I recently worked on an NC-125 with strange symptoms. I

```
>measured about -0.7
> V on the AVC line even with the power off. It turns out
> that all of the AVC
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> circuit. On one of
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> the caps were
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> Aerovox 0.01uF wax
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> I also replaced  all of the other bypass and coupling
> caps. Several of
> these also acted like little batteries but with  a lower
> voltage. I
> mentioned this to some friends and two (out of maybe 20)
> of them had seen
> the same thing over the years.
>
> John, KU6X
>
     I ran into the same thing on my AR-88. The caps were
Micamold paper caps. A couple had turned into batteries.


--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com




From gumbear at pacbell.net  Sat Sep 14 21:20:49 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 14 Sep 2013 18:20:49 -0700
Subject: [BoatAnchors] HQ-129X-thanks
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
 <00c001ceb18e$84206130$4301a8c0@KB6NAX> <074601ceb199$9ee95ed0$dcbc1c70$@com>
Message-ID: <000f01ceb1b1$d66e6590$4301a8c0@KB6NAX>

> .....It turns out that all of the AVC
bypass caps were behaving like little batteries. .......
```

I'm not an electrochemist but I'm betting the moisture and resultant acidification produced the battery effect. Applying voltage recharges the battery. There might also be a dielectric absorbtion mechanism operating but if it was only that the voltage would decline to zero much quicker than the battery self discharging. We don't want no stinking batteries on the AVC line....

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,
and make a friend forever =:-)

From rbsingl at ilstu.edu Sat Sep 14 21:53:17 2013
From: rbsingl at ilstu.edu (Singley, Rodger)
Date: Sun, 15 Sep 2013 01:53:17 +0000
Subject: [BoatAnchors] HQ-129X-thanks
In-Reply-To: <000f01ceb1b1$d66e6590$4301a8c0@KB6NAX>
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
 <00c001ceb18e$84206130$4301a8c0@KB6NAX>
 <074601ceb199$9ee95ed0$dcbc1c70$@com> <000f01ceb1b1$d66e6590$4301a8c0@KB6NAX>
Message-ID: <0DEBF1C8D8437248BE53CD4213B89BD322F0D78C@ISUEMBX02.ad.ilstu.edu>

Several years ago I installed a 4 element triband quad and an Orion rotator. The Orion uses a microswitch triggered by rotation of the drive motor which sends pulses to the controller unit as the motor runs to track position. About a week after it was up I found the antenna and controller were out of sync. I verified that the antenna hadn't slipped on the mast and the mast hadn't slipped in the motor and then recalibrated and all was good for two days and then again it was close to 20 degrees off. I discovered that whenever there was fog it would lose calibration and while making measurements I found that with the cable unplugged from the controller there was still voltage across the contact lines from the microswitch. The problem was whatever "grease" Orion used in the connector interacted with the metal contacts and moisture to form a weak battery and the stray voltage generated caused the loss of calibration problem. I cleaned out the factory stuff and replaced it with some good dielectric grease and the problem has never returned.

Rodger WQ9E

Dr. Rodger B. Singley
Professor of Marketing

> -----Original Message-----
> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
> Of Arden Allen
> Sent: Saturday, September 14, 2013 8:21 PM
> To: John Hurst; boatanchors at theporch.com
> Subject: Re: [BoatAnchors] HQ-129X-thanks
>
> > .....It turns out that all of the AVC
> bypass caps were behaving like little batteries. ....
>
> I'm not an electrochemist but I'm betting the moisture and resultant
> acidification produced the battery effect. Applying voltage recharges
> the battery. There might also be a dielectric absorbtion mechanism
> operating but if it was only that the voltage would decline to zero
> much quicker than the battery self discharging. We don't want no
> stinking batteries on the AVC line....
>
> Arden Allen
> KB6NAX
>
> Adopt a shelter dog,
> save an innocent life,
> and make a friend forever =:-)
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From arc5 at ix.netcom.com Sat Sep 14 22:46:43 2013
From: arc5 at ix.netcom.com (David Stinson)
Date: Sat, 14 Sep 2013 21:46:43 -0500
Subject: [BoatAnchors] Wayne Green, W2NSD, Dead at 91.
Message-ID: <AFF591A41CAE419FABA42AEBF26247FD@CompaqSR5710F>

I just received this:

Wayne Green passed away this morning in a peaceful,
painless transition from this life on Earth.
An eternal optimist, and one who loved to share
his neverending zest for life, he was a friend
to many and will bemissed greatly.
Wayne was not afraid of dying and was very much ready to
embark on his next great adventure to the afterlife.
73,
W2NSD (Sept 3, 1922 - Sept 13, 2013)

I met Wayne Green and spoke with him many years ago
in Las Vegas; mid-1980s.
We spoke of my experimentation with Longwave,
which was just beginning. He was very positive and encouraging
to a then-young ham who had been told by just about everyone else
that it was "a waste of time." I went on to be the first to break
1000 miles and first to break 2000 miles on 1750 mtrs and
I credit, in part, his enthusiasm for trying new things that
I kept at it until it "worked."
He was also the first editor to ever buy a piece of mine.

The Almighty keep you and comfort your family, Wayne.
We'll miss you.

GL OM ES 73 DE Dave AB5S

From wb3fau55 at neo.rr.com Sun Sep 15 11:39:50 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Sun, 15 Sep 2013 11:39:50 -0400
Subject: [BoatAnchors] HQ-129X-tuning backlash
Message-ID: <20130915153950.HD945.14393.root@hrndva-web03-z02>

thanks for the input guys, evidently someone took these dial drives apart. I
took them apart, cleaned and lubed everything. I reassembled the drives with
one tooth of preload. Tuning is now perfect and no backlash. A very cool old
receiver! 73s Russ.

From gsantacanav at gmail.com Sun Sep 15 11:43:12 2013
From: gsantacanav at gmail.com (Guido Santacana)
Date: Sun, 15 Sep 2013 11:43:12 -0400
Subject: [BoatAnchors] HQ-129X-thanks
In-Reply-To: <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
References: <20130913221552.F8QKE.8089.root@hrndva-web03-z02>
 <771B6054226B4361B365770C01DD7E1F@VALUED20606295>
Message-ID: <CAO1yix0gdgZfRU7WFY6R+-FtUfqLF=D9xWxXhpMGc3azgzWg_w@mail.gmail.com>

I have owned two HQ129X receivers. The first one had already been recapped
with disc ceramic caps. I recapped the second with new plastic tubular
axial caps. It was full of old Sprague black beauties. After removing them
I tested them for leakage on my Sprague TO-4 and they all tested well.
Probably I could have used them for a while but with a 365 days high
humidity climate it was too much risk. Paper caps never lasted long here so
Radio Repair shops had a very good business going in old times. The only

thing where both HQ129Xs gave me some trouble was the AVC that tended to overload.

Best 73s

Guido KP4FAR

On Saturday, September 14, 2013, Richard Knoppow <1oldlens1 at ix.netcom.com> wrote:

>
> ----- Original Message ----- From: <wb3fau55 at neo.rr.com>
> To: <boatanchors at theporch.com>
> Sent: Friday, September 13, 2013 3:15 PM
> Subject: [BoatAnchors] HQ-129X-thanks
>
>
> I have had a few of these over a period of 20 years. This unit seems to
>> have been stored in a dry place. It works a lot better than the others
>> I had. Thanks for your input. I will not likely try to reinvent the wheel
>> with this project. I have a lot of other cool receivers that work
>> better on 10m.
>> Recently purchased a Drake SPR-4 from an estate. That is a real hot
>> performer. 73s Russ.
>>
>
>   I think I would bite the bullet and just replace all the paper caps.
> My HQ-129-X has molded plastic caps, certainly original. I lifted and
> tested a couple with a bridge but that did not measure leakage. The chassis
> looked so clean I decided to just leave them alone but I am beginning to
> have failures so think its best to just dump them all. If yours are the wax
> covered paper kind I would certainly replace them. There are only a
> couple of places where the caps are hard to get at. The problem with old
> paper caps is that the degradation is so slow that you may not be aware of
> the effect on performance until you get some sort of failure. Paper caps
> seem to have always had a life limit. Partly it varies with the voltage on
> the cap versus the rated voltage, that is, the lower the voltage on the cap
> the longer they will last. The effect is evidently some sort of
> electro-chemical change in the paper itself. Later caps used plastic
> impregnated paper which was supposed to yield longer life and maybe did
> with the exception of the notorious Black Beauty caps but I think those
> were defective in manufacture. Nonetheless all the old molded plastic or
> plastic impregnated caps I've checked for leakage had a lot regardless of
> brand.
>   Modern plastic dielectric caps have vanishingly small leakage, very low
> ESR, and probably unlimited liftetime. They also work well at reasonably
> high RF frequencies, certainly better than the original caps.
>

```
>
> --
> Richard Knoppow
> Los Angeles
> WB6KBL
> dickburk at ix.netcom.com
>
>
> _______________________________**________________
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/**mailman/listinfo/boatanchors<https://
minime.theporch.com/mailman/listinfo/boatanchors>
>
```

From wb0eq at yahoo.com Sun Sep 15 12:05:48 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 15 Sep 2013 09:05:48 -0700 (PDT)
Subject: [BoatAnchors] Hammarlund HQ-129 perfromance
Message-ID: <1379261148.39837.YahooMailNeo@web161005.mail.bf1.yahoo.com>

As long as your receiver can hear antenna noise on the band of interest, you have all the useable sensitivity you can use with that particular combination. ?Then the sensitivity is limited ?by external factors (what noise the antenna hears) not the radio.

Check this by disconnecting the antenna you intend to use, say, on 10 m in your case; substitute an antenna dummy load of appropriate impedance. ?The background noise level will drop if you are antenna noise level limited rather than limited by the first RF stage noise. ?

A preamplifier is of NO USE in this situation.

I'm assuming a correctly operating radio here, properly aligned, and with a first RF stage tube of normal gain & noise.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From wb0eq at yahoo.com Sun Sep 15 12:41:37 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 15 Sep 2013 09:41:37 -0700 (PDT)
Subject: [BoatAnchors] Wane Green
Message-ID: <1379263297.50917.YahooMailNeo@web161005.mail.bf1.yahoo.com>

Wayne Green was a pisser for sure! ?I mean that in a complimentary way.

He bought my first ham radio article (and many more) for 73.

He was a constant thorn in the side of the ARRL--I think justifiably so in many ways. ?The ARRL certainly made some major bloopers in the day, e.g. incentive licensing & how that was handled by the FCC. ?I believe the ARRL is today a much better organization.

The ARRL once held its annual meeting in Hartford CT. ?Unbelievably, they invited Wayne to speak. ?What were they thinking? ?Fox in the henhouse!! ?

I was there & got to meet the Man himself. ?I was thrilled. ?What a one-sided roast of the ARRL he gave & so richly deserved.

RIP.
?

--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From spr at earthlink.net Sun Sep 15 13:06:14 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 10:06:14 -0700
Subject: [BoatAnchors] MFJ Nuvistor Preselectors,
     was Re: HQ-129X- performance
In-Reply-To: <0DEBF1C8D8437248BE53CD4213B89BD322F0D680@ISUEMBX02.ad.ilstu.edu>
References: <9s7q7eepesdmkrs1bq6bnuga.1379074132369@email.android.com>
 <002c01ceb0b6$b93e3000$4301a8c0@KB6NAX> <52336C26.9060403@earthlink.net>
 <52347AED.30305@kd5byb.net>
 <0DEBF1C8D8437248BE53CD4213B89BD322F0D680@ISUEMBX02.ad.ilstu.edu>
Message-ID: <5235E906.4000805@earthlink.net>

Folks,

Sorry, yes it's an Ameco model PCL. Works great, and it's of course filamentarian. They also made sand state ones, but that isn't what I have.

/scott

On 9/14/13 8:50 AM, Singley, Rodger wrote:
> Are you maybe thinking about the Ameco preamplifiers with nuvistors? I think by the time MFJ was born Nuvistors were already commercially obsolete.
>
> Rodger WQ9E
>
> Dr. Rodger B. Singley
> Professor of Marketing
>
>
>> -----Original Message-----
>> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf

```
>> Of Ben Hall
>> Sent: Saturday, September 14, 2013 10:04 AM
>> To: Scott Robinson
>> Cc: boatanchors at theporch.com
>> Subject: [BoatAnchors] MFJ Nuvistor Preselectors, was Re: HQ-129X-
>> performance
>>
>> Hi Scott,
>>
>> So I immediate cruised over to the e-place to take a look-see.
>> Couldn't figure out which might be the cascode nuvistor models - got a
>> model number by chance?
>>
>> thanks much and 73,
>> ben, kd5byb
>>
>
>


From wb0eq at yahoo.com  Sun Sep 15 13:22:32 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 15 Sep 2013 10:22:32 -0700 (PDT)
Subject: [BoatAnchors] Authorship -73 Magazine has been scanned and indexed!
Message-ID: <1379265752.50343.YahooMailNeo@web161001.mail.bf1.yahoo.com>

> The cool thing is an indexed reference that can be read online. This is like?
> Google Books for geeks


>?http://mikeyancey.com/73mag/listauthor.php?
->
> everything I ever wrote for them!? The good ol' days>?


Unlike QST's on line archives, you can look at an entire issue.

?
-John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada


From spr at earthlink.net  Sun Sep 15 13:30:37 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 10:30:37 -0700
Subject: [BoatAnchors] HQ-129X-  performance
In-Reply-To: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>
References: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>
Message-ID: <5235EEBD.7000600@earthlink.net>
```

Hi Russ,

It is easy to measure, if you have a calibrated signal generator. You tune the genny and radio together and tgurn the generator output down until the S/S+N ratio is 10 dB; the RF input that makes thi happen is the quoted sensitivity. This is generally done at 5 KHZ or so IF BW.

My SX-28 does about 2.5 uV on all bands, now that I have fixed the toasted antenna coil primary on one band.   800 nv is the same a 0.8 uV.

Regadrs,

Scott

On 9/15/13 8:29 AM, wb3fau55 at neo.rr.com wrote:
> 800 nanovolts, bet that's easy to measure... I will use one of my newer
> receivers when things get rough...Russ.
> ---- Scott Robinson <spr at earthlink.net> wrote:
>>
>> I have one of the MFJ cascode nuvistor preselectors, and its noise floor
>> is about 800 nanovolts, which is very good indeed. You can find them on
>> eBay for less than fifty bucks.
>>
>> Regards,
>>
>> Scott
>> ____
>> BoatAnchors mailing list
>> BoatAnchors at theporch.com
>> https://minime.theporch.com/mailman/listinfo/boatanchors
>
>

From gumbear at pacbell.net Sun Sep 15 14:41:44 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 15 Sep 2013 11:41:44 -0700
Subject: [BoatAnchors] Wane Green
References: <1379263297.50917.YahooMailNeo@web161005.mail.bf1.yahoo.com>
Message-ID: <002001ceb243$cb94c280$4301a8c0@KB6NAX>

> .....Wayne Green was a pisser for sure! .....

Wayne was a sort of cult hero in ham circles. I remember reading him in 73 when I was a kid. Little did I understnd what the hullabaloo all was about. I still don't today, as a matter of fact :-)

But we are a richer community for his legacy.

Arden Allen
KB6NAX

If you get to thinking you're a person of
some influence, try ordering somebody
else's dog around. -Will Rogers

From gumbear at pacbell.net Sun Sep 15 14:57:50 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 15 Sep 2013 11:57:50 -0700
Subject: [BoatAnchors] HQ-129X- performance
References: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>
 <5235EEBD.7000600@earthlink.net>
Message-ID: <002e01ceb245$8a0dc990$4301a8c0@KB6NAX>

> ....You tune the genny and radio together and tgurn the generator
output down
until the S/S+N ratio is 10 dB; the RF input that makes thi happen is
the quoted sensitivity. This is generally done at 5 KHZ or so IF BW.
....

Just to add, Scott, the 10 dB reading is accomplished by turning the
generator modulation on and off until the audio output changes by 10 dB.
Both average responding and RMS AC volt meters will give similar results.
The modulation level for the standard measurement is 30% of 1000 Hz.

Arden Allen
KB6NAX

The average dog is a nicer person than
the average person. -Andy Rooney

From wb3fau55 at neo.rr.com Sun Sep 15 15:51:12 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Sun, 15 Sep 2013 19:51:12 +0000
Subject: [BoatAnchors] MFJ Nuvistor Preselectors,
 was Re: HQ-129X- performance
In-Reply-To: <5235E906.4000805@earthlink.net>
Message-ID: <20130915195112.XDI2W.15524.root@hrndva-web03-z02>

Sounds like the item I remember, by Ameco. I don't think MFJ was around yet
building

nuvistor preamps-hi.
---- Scott Robinson <spr at earthlink.net> wrote:
> Folks,
>
> Sorry, yes it's an Ameco model PCL. Works great, and it's of course
> filamentarian. They also made sand state ones, but that isn't what I have.
>
> /scott
>
> On 9/14/13 8:50 AM, Singley, Rodger wrote:
> > Are you maybe thinking about the Ameco preamplifiers with nuvistors? I think by the time MFJ was born Nuvistors were already commercially obsolete.
> >
> > Rodger WQ9E
> >
> > Dr. Rodger B. Singley
> > Professor of Marketing
> >
> >
> >> -----Original Message-----
> >> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
> >> Of Ben Hall
> >> Sent: Saturday, September 14, 2013 10:04 AM
> >> To: Scott Robinson
> >> Cc: boatanchors at theporch.com
> >> Subject: [BoatAnchors] MFJ Nuvistor Preselectors, was Re: HQ-129X-
> >> performance
> >>
> >> Hi Scott,
> >>
> >> So I immediate cruised over to the e-place to take a look-see.
> >> Couldn't figure out which might be the cascode nuvistor models - got a
> >> model number by chance?
> >>
> >> thanks much and 73,
> >> ben, kd5byb
> >>
> >
> >
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From spr at earthlink.net Sun Sep 15 15:59:41 2013
From: spr at earthlink.net (Scott Robinson)

Date: Sun, 15 Sep 2013 12:59:41 -0700
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <002e01ceb245$8a0dc990$4301a8c0@KB6NAX>
References: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>
 <5235EEBD.7000600@earthlink.net> <002e01ceb245$8a0dc990$4301a8c0@KB6NAX>
Message-ID: <523611AD.30601@earthlink.net>

Just right. Turning the carrier on and off is how the video about R390s
gets 0,5 uV sensitivity, and it's the wrong method.

Thanks,

/scott

On 9/15/13 11:57 AM, Arden Allen wrote:
>> ....You tune the genny and radio together and tgurn the generator
> output down
> until the S/S+N ratio is 10 dB; the RF input that makes thi happen is
> the quoted sensitivity. This is generally done at 5 KHZ or so IF BW.
> ....
>
> Just to add, Scott, the 10 dB reading is accomplished by turning the
> generator modulation on and off until the audio output changes by 10 dB.
> Both average responding and RMS AC volt meters will give similar results.
> The modulation level for the standard measurement is 30% of 1000 Hz.
>
> Arden Allen
> KB6NAX
>
> The average dog is a nicer person than
> the average person. -Andy Rooney
>
>

From wb3fau55 at neo.rr.com Sun Sep 15 16:15:57 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Sun, 15 Sep 2013 16:15:57 -0400
Subject: [BoatAnchors] bypass and couplers
Message-ID: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>

I think most of us agree that old caps go bad, in time. Some dielectrics are
worse than others. So a question for you guys- Sprague Orange Drops vs. the
newer yellow poly-pro caps.   Pros and cons- have it guys...

From wb3fau55 at neo.rr.com Sun Sep 15 16:20:22 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)

Date: Sun, 15 Sep 2013 16:20:22 -0400
Subject: [BoatAnchors] Olsen oilcon caps
Message-ID: <20130915202022.0M37C.15675.root@hrndva-web03-z02>

anyone remember those? I think they were similar to Vitamin Qs. Russ.

From gumbear at pacbell.net Sun Sep 15 16:22:14 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 15 Sep 2013 13:22:14 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
Message-ID: <001701ceb251$471b0010$4301a8c0@KB6NAX>

> I think most of us agree that old caps go bad, in time. Some dielectrics are worse than others. So a question for you guys- Sprague Orange Drops vs. the
newer yellow poly-pro caps. Pros and cons- ....

Everything goes bad in time. Plastic film capacitors will outlive us all. The audiophooles replace them with junk to make their ears wiggle in the wind...

Arden Allen
KB6NAX

It would be a horrible world if everything was on two legs.
-Cleveland Amory

From kd5byb at kd5byb.net Sun Sep 15 16:32:49 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 15 Sep 2013 15:32:49 -0500
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
Message-ID: <52361971.7010004@kd5byb.net>

My thoughts...worth about what you've paid for them:

Any modern cap you install today will last far longer than any of the old styles. I think it comes down to what you like.

I've used metalized polypropylene units by Xicon and Panasonic for years. No issues.

Recently, in replacing the caps in my RBA receiver, I used Orange Drops

simply because you can get them with very long leads and I thought I
would need the length. (turns out I didn't)

In the past, I've used the axial yellow jobs when nothing but an axial
capacitor would fit.

thanks and 73,
ben, kd5byb

On 9/15/2013 3:15 PM, wb3fau55 at neo.rr.com wrote:
> I think most of us agree that old caps go bad, in time. Some
> dielectrics are worse than others. So a question for you guys-
> Sprague Orange Drops vs. the newer yellow poly-pro caps.

From wb3fau55 at neo.rr.com Sun Sep 15 16:49:29 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Sun, 15 Sep 2013 16:49:29 -0400
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <001701ceb251$471b0010$4301a8c0@KB6NAX>
Message-ID: <20130915204929.U9Y1W.15788.root@hrndva-web03-z02>

now Arden, get the term right- Audio Phools...
---- Arden Allen <gumbear at pacbell.net> wrote:
> > I think most of us agree that old caps go bad, in time. Some dielectrics
> are worse than others. So a question for you guys- Sprague Orange Drops
> vs. the
> newer yellow poly-pro caps.   Pros and cons- ....
>
> Everything goes bad in time. Plastic film capacitors will outlive us all.
> The audiophooles replace them with junk to make their ears wiggle in the
> wind...
>
> Arden Allen
> KB6NAX
>
> It would be a horrible world if everything was on two legs.
> -Cleveland Amory
>

From spr at earthlink.net Sun Sep 15 16:51:25 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 13:51:25 -0700
Subject: [BoatAnchors] HQ-129X- performance
In-Reply-To: <2F8E4EE337994B3EA29E44E1DDAFF2AF@VALUED20606295>
References: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>

<5235EEBD.7000600@earthlink.net>
<2F8E4EE337994B3EA29E44E1DDAFF2AF@VALUED20606295>
Message-ID: <52361DCD.6030008@earthlink.net>

Hi Richard,

Yes, that's the method I described, with a useful addendum from Arden.
to just measure receiver requird oinput signal for 10 dB S+N/N at the
output, no calibrated noise source is needed.

/scott

On 9/15/13 1:10 PM, Richard Knoppow wrote:
>
> ----- Original Message ----- From: "Scott Robinson" <spr at earthlink.net>
> To: <boatanchors at theporch.com>
> Sent: Sunday, September 15, 2013 10:30 AM
> Subject: Re: [BoatAnchors] HQ-129X- performance
>
>
>> Hi Russ,
>>
>> It is easy to measure, if you have a calibrated signal generator. You
>> tune the genny and radio together and tgurn the generator output down
>> until the S/S+N ratio is 10 dB; the RF input that makes thi happen is
>> the quoted sensitivity. This is generally done at 5 KHZ or so IF BW.
>>
>> My SX-28 does about 2.5 uV on all bands, now that I have fixed the
>> toasted antenna coil primary on one band.   800 nv is the same a 0.8 uV.
>>
>> Regadrs,
>>
>> Scott
>
>   There is a standard method for measuring noise on communications
> receivers. I will describe it below. However, while this method was
> specified in the handbooks for many receivers it is NOT a true measure
> of noise. Its main purpose is to determine if a receiver is working
> properly. The noise output of a receiver is dependent on its bandwidth
> among other factors. Where the bandwidth and shape factor of two
> receivers is different the noise measured by the Signal/Signal+noise
> method can not be used to compare them except very roughly. A better
> method, and the one mostly used now, is to measure _noise figure_
> sometimes called _noise factor_. This is the ratio of the noise output
> of the receiver compared to the noise that would come from an ideal,
> noise-free receiver. Because it takes bandwidth and band shape into
> account, at least for the most part, it can be used to compare receivers
> of different bandwidths and designs. More below but first the S/S+N method.

> The is often measured for a 10X ratio but sometimes for a 10db ratio or a 6db ratio and maybe others. One must be careful about reading what the ratio is supposed to be when making a measurement to be compared to the manufacturer's spec.
>
> The method requires that the signal generator deliver a calibrated voltage to the antenna terminals of the receiver. Most receivers also specify an antenna load. This is sometimes resistive but in some cases is a dummy load of specified composition.
>
> With this load on the antenna terminals the signal generator is set up of the frequency of interest. It is set for 30% modulation at 400 Hz. This combination is almost universal. The receiver is set for manual RF gain and the gain control set at maximum. The output should be terminated in the characteristic impedance of the receiver and a meter put across the load. A speaker can be used. The signal generator output is adjusted for a convenient starting point and the meter is set for a convenient reference level. Then the modulation is turned off and the ratio of modulated to unmodulated measured. Reset the output level of the generator to obtain a new reference level on the output meter. Turn the modulation on again and measure the ratio of levels. Adjust the output of the signal generator to adjust the level if necessary. The signal generator level is used to adjust the output level of the _modulated_ signal and the receiver audio gain to adjust the level of the unmodulated signal. These two are juggled until the desired ratio is achieved. Once you have that read the signal level from the generator, that is the signal level for the signal to noise measurement.
>
> A similar measurement can be made for CW using the BFO. In this case the signal generator is not modulated but the measurements are made with the BFO on for the equivalent of a modulated signal and with it off for the carrier level.
>
> Since the noise output varies with the bandwidth you will find on variable bandwidth receivers the signal to noise ratio will increase as the bandswitch is made more narrow. Even old very noisy receivers with crystal filters will exhibit very good sensitivity when the crystal is in minimum bandwidth. This must be measured using the CW method because usually the bandwidth is too narrow for a modulated signal to be measured correctly (the effective modulation percentage is reduced). Even a receiver like the HQ-129-X will have a high ratio for signals of a fraction of a microvolt when measured with the crystal filter in use.
>
> Noise figure: Noise figure requires a calibrated wide-band noise generator. Because of the physics of a starved filament diode its possible to get a pretty accurate noise generator by calculating the noise.
>
> The measurement is simple; the generator is attached to the receiver and the noise output measured. Then the generator is replaced by a resistor of the same value as the antenna impedance that will be connected in actual use. The ratio of the two measurements is made and converted to decibels. This is the noise figure. The closer the two measurements are to zero db the better. Typical modern communications receivers have NF of around 6 to 8 db, some much better. A receiver with

> this sort of NF will be limited by atmospheric noise below about 30 Mhz
> and maybe higher. At VHF UHF and microwave frequencies the NF becomes
> critical. Since the noise generated in the input stage is partly
> dependent on temperature one finds various types of cooling arrangements
> for the amplifier including super cooling with liquid gasses. Getting
> even a fraction of a db improvement in something like a radio-telescope
> is worth considerable effort and each fractional improvement becomes
> more difficult. For HF communications receivers a decent antenna will
> generally deliver considerably more noise than is generated by the
> receiver.
>   A final note; some older receivers have "sensitivity" specs. These
> are a measure of the modulated RF input needed to deliver a given audio
> output with all the gain controls at maximum. While it may be useful to
> check that the receiver gain is normal it is useless as a measure of
> noise or even the ability of the receiver to detect weak signals. Mostly
> it was advertising buzz.
>
> --
> Richard Knoppow
> Los Angeles
> WB6KBL
> dickburk at ix.netcom.com
>

From w9ac at arrl.net Sun Sep 15 16:57:21 2013
From: w9ac at arrl.net (Paul Christensen)
Date: Sun, 15 Sep 2013 16:57:21 -0400
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
Message-ID: <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>

By their respective film type category, polypropylene (PP) exhibits lower dielectric absorption and dissipation factor than Polyester (PET). I think we would be hard-pressed to find a boatanchor application where the resulting performance difference can be measured. Any performance loss/gain is masked by too many other factors.

I generally re-cap with polypropylene "yellow jacket" types -- mainly because I don't like working with the Orange Drop's radial leads.

It's hard to believe, but there's a high dollar market for used Sprague Black beauty and Bumblebee paper dielectric caps -- the same type the rest of us gut out of our gear and can't dispose of quickly enough.   I do think that the failure rate among these two types is a bit blown out of proportion. Of all the Black Beauty caps I've measured, only a small number have failed leakage and/or dielectric absorption testing on my Sencore LC

102 analyzer.   However, I do change them as a proactive measure -- since I
never know if these caps will last another 40 years or will they fail
tomorrow? Through replacement with PP, I won't worry about it in this
lifetime.

Paul, W9AC

----- Original Message -----
From: "Arden Allen" <gumbear at pacbell.net>
To: <wb3fau55 at neo.rr.com>; <boatanchors at theporch.com>
Sent: Sunday, September 15, 2013 4:22 PM
Subject: Re: [BoatAnchors] bypass and couplers

>> I think most of us agree that old caps go bad, in time. Some
>> dielectrics
> are worse than others. So a question for you guys- Sprague Orange
> Drops
> vs. the
> newer yellow poly-pro caps.   Pros and cons- ....
>
> Everything goes bad in time. Plastic film capacitors will outlive us all.
> The audiophooles replace them with junk to make their ears wiggle in the
> wind...
>
> Arden Allen
> KB6NAX
>
> It would be a horrible world if everything was on two legs.
> -Cleveland Amory
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From spr at earthlink.net Sun Sep 15 17:02:28 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 14:02:28 -0700
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
Message-ID: <52362064.3090205@earthlink.net>

Folks,

Well, the yellow ones (0.047 mfd) generally measure about 50,000 megohms on my General Radio 1862-A at 500V. The orange drops measure almost open.

That said, 50KMegs won't upset any normal radio circuit, and I have used the yellow caps for years with no trouble. Their axial leads fit better into the existing wiring schemes in many cases.

If you want better (in this case less lossy and more linear) caps, try spending a little more and buying polypropylene parts. Being an audio engineer, I'm very fussy about linearity, but in BA circuitry you'll never see the difference. For bypasses, it doesn't matter anyway.

This is NOT audiophoolery. These are readily measurable effects if you have access to an Audio Precision audio analyzer, which is the current state of the art for this kind of measurement. I think the total harmonic distortion measurement floor for these is now about 0.0003%, or maybe even maybe better. The usual BA audio amp does about 10% at full power. Really nice tube amp circuitry (and I did fit 4 watts of this into my SP600...) does 0.1-0.3% at full power, and all of it low order harmonics, the kind you mostly can't hear because they're masked by the signal.

Regards,

Scott Robinson

On 9/15/13 1:15 PM, wb3fau55 at neo.rr.com wrote:
> I think most of us agree that old caps go bad, in time. Some dielectrics are worse than others. So a question for you guys- Sprague Orange Drops vs. the newer yellow poly-pro caps.   Pros and cons- have it guys...
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From spr at earthlink.net Sun Sep 15 17:04:48 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 14:04:48 -0700
Subject: [BoatAnchors] Mail delivery failed: returning message to sender
Message-ID: <523620F0.3070009@earthlink.net>

Folks,

I agree with Arden that the only really still good paper caps were the hermetically sealed ones with no moisture in them. I have one such still in service in a 1939 GE console radio as an audio coupling cap. My 500,00 megohm range megger thinks it's good, too.

I will also caution you all about bathtub caps: when you're checking them, *DO* measure not only from lead-to-lead but from each lead to the case. They get leaky that way, too.

On the old usenet list rec.antiques.radio+phono, we once had a 3 day debate over whether to replace all caps in a set under restoration on only the ones immediately causing a problem. One person--a retired radio repairman--insisted that doing them all cheated your customer. It took 3 days of "what, are you nuts?" before someone thought to ask him where he lived. As I recall, it was Phoenix, Arizona. He'd been working on stuff that had lived its entire life in 10% humidity, and it does make a difference.

Do remember that even micas sometimes fail, in my experience generally by going open or becoming noisy and with reduced capacitance. My R-390A had at least 6 fail this way, and as they were in resonant circuits it fair drove me nuts figuring out what was wrong. I also applied DeOxit ot the moving bits of the ceramic trimmers, to good effect.

BTW-the clue in the '390 is to look along the slug racks for the one slug that is screwed all the way in. That's where the bad mica or bad connection trimmer is.

Capacitors: ya cain't live without 'em, and ya cain't shoot 'em.

Peace, and happy Farads,

/scott robinson

Arden Allen wrote:
>
>> Barry, some time ago, gave a good explanation of the problems with aged
>> paper caps. What I remember is that the constituents in paper when
>> subjected to moisture produce an acid that is responsible for the
>> increasing
>> leakage. The only paper caps that could avoid the problem were the metal
>> glass button hermetically sealed types like Sprague's Vitamin Q line.
>> All
>> other capacitor encapsulation types are not impervious to moisture
>> ingress.
>
>> Arden Allen
>> KB6NAX

and Richard Knoppow also said:

> The quality of paper caps does indeed seem to be highly variable.
> For instance, in my recently rebuilt AR-88 the bathtub caps had all
> developed bad seals and leaked transformer oil all over.

From spr at earthlink.net Sun Sep 15 17:05:23 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 14:05:23 -0700
Subject: [BoatAnchors] Mail delivery failed: returning message to sender
Message-ID: <52362113.3070507@earthlink.net>

They might have used white grease with lithium salts in it.

/scott

On 9/14/13 6:53 PM, Singley, Rodger wrote:
> Several years ago I installed a 4 element triband quad and an Orion rotator. The Orion uses a microswitch triggered by rotation of the drive motor which sends pulses to the controller unit as the motor runs to track position. About a week after it was up I found the antenna and controller were out of sync. I verified that the antenna hadn't slipped on the mast and the mast hadn't slipped in the motor and then recalibrated and all was good for two days and then again it was close to 20 degrees off. I discovered that whenever there was fog it would lose calibration and while making measurements I found that with the cable unplugged from the controller there was still voltage across the contact lines from the microswitch. The problem was whatever "grease" Orion used in the connector interacted with the metal contacts and moisture to form a weak battery and the stray voltage generated caused the loss of calibration problem. I cleaned out the factory stuff and replaced it with some

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>   ood dielectric grease and the problem has never returned.
>
> Rodger WQ9E
>
> Dr. Rodger B. Singley
> Professor of Marketing
>
>
>
>> -----Original Message-----

>> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf
>> Of Arden Allen
>> Sent: Saturday, September 14, 2013 8:21 PM
>> To: John Hurst; boatanchors at theporch.com
>> Subject: Re: [BoatAnchors] HQ-129X-thanks
>>
>>> .....It turns out that all of the AVC
>> bypass caps were behaving like little batteries. ....
>>
>> I'm not an electrochemist but I'm betting the moisture and resultant
>> acidification produced the battery effect. Applying voltage recharges
>> the battery. There might also be a dielectric absorbtion mechanism
>> operating but if it was only that the voltage would decline to zero
>> much quicker than the battery self discharging. We don't want no
>> stinking batteries on the AVC line....
>>
>> Arden Allen
>> KB6NAX
>>
>> Adopt a shelter dog,
>> save an innocent life,
>> and make a friend forever =:-)
>>
>> ____
>> BoatAnchors mailing list
>> BoatAnchors at theporch.com
>> https://minime.theporch.com/mailman/listinfo/boatanchors
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From 4cx250b at miamioh.edu Sun Sep 15 17:07:07 2013
From: 4cx250b at miamioh.edu (MU 4CX250B)
Date: Sun, 15 Sep 2013 15:07:07 -0600
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
Message-ID: <2785162449097778892@unknownmsgid>

I found that roughly half of the black beauty capacitors in a KWM1
were cracked with leaking electrolyte. Generally, I find that they are
fairly reliable in low-voltage applications, such as cathode bypass or

tone control circuits. As Paul noted, some of them are in high demand by audiophiles, who like the distortion they introduce in vacuum tube guitar amplifiers. I routinely replace all of them.
73
Jim W8ZR

> It's hard to believe, but there's a high dollar market for used Sprague Black beauty and Bumblebee paper dielectric caps -- the same type the rest of us gut out of our gear and can't dispose of quickly enough.   I do think that the failure rate among these two types is a bit blown out of proportion. Of all the Black Beauty caps I've measured, only a small number have failed leakage and/or dielectric absorption testing on my Sencore LC 102 analyzer.

From w9ac at arrl.net Sun Sep 15 17:53:58 2013
From: w9ac at arrl.net (Paul Christensen)
Date: Sun, 15 Sep 2013 17:53:58 -0400
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <52362064.3090205@earthlink.net>
Message-ID: <9F07B67D57084D8EB79CF3BB3E5BB055@DBTOA000>

> This is NOT audiophoolery. These are readily measurable effects if you have access to an Audio Precision audio analyzer, which is the current state of the art for this kind of measurement. I think the total harmonic distortion measurement floor for these is now about 0.0003%, or maybe even maybe better.

Nice, but I doubt there's an audible difference in double-blind testing. About a year ago, I was engaged in a debate with a good friend of mine over the use of tantalum caps for audio coupling. He rightly pointed out the measured THD specs from the Nichicon datasheets under a typical test set-up. As I recall, there was some additional data comparing TIM (transient IM distortion) between the two types. Yes, the tantalums were worse by a magnitude of roughly two decimal places, but still well under 0.1% THD in Nichicon's test circuit.

Despite knowing how "bad" a tantalum is when used as an audio coupling cap, I still happily use them when there's a space constraint. In the 1970s, some prominent high-end consumer (and some professional) audio equipment manufacturers used tantalums when coupling into Lo-Z interstage loads. The world of audio is filled with some pretty wacky science.

As a point of reference, the FCC's THD limit for commercial FM broadcast -- back when there was an annual proof-of-performance requirement and broadcast engineers actually measured these things -- was 3.5% from 50 Hz to 100Hz; 2.5% from 100 Hz to 7.5 KHz; then 3% up to the 15 kHz limit. Analog FM performance is capable of much better numbers today, but stations deliberately degrade performance in pursuit of dial prominence.

I can measure THD down to 0.0015% with my Tektronix AA-501A analyzer when sourced from its mating SG-505 oscillator. I will never hear that level of distortion. And at 0.1% THD, I (any likely all of us), cannot discern even that level at any audible frequency. At 1% THD, I don't immediately detect THD up to 5 kHz unless I'm closely conducting a fast A-B comparison. THD measurements beyond about 6 kHz are mostly a waste of time since the first odd order harmonic is at 18 kHz. Few of us on this list will have that kind of acute hearing ability -- any maybe never did.

Paul, W9AC

From w9ac at arrl.net Sun Sep 15 17:59:48 2013
From: w9ac at arrl.net (Paul Christensen)
Date: Sun, 15 Sep 2013 17:59:48 -0400
Subject: [BoatAnchors] Mail delivery failed: returning message to sender
References: <523620F0.3070009@earthlink.net>
Message-ID: <C059C83336344FD1BC373A6A8C7542F0@DBTOA000>

> "Do remember that even micas sometimes fail, in my experience generally by
> going open or becoming noisy and with reduced capacitance. My R-390A had
> at least 6 fail this way..."

If the R-390A is similar to the 75A-4, a large number of silver mica caps fail. I was able to restore sensitivity on a 75A-4 by replacing about a half-dozen of them in the I.F. interstages. Apparently, silver migrates through the insulation and causes dielectric leakage. I know little of the chemistry involved. Perhaps others can comment on the properties of silver when used as a cap.

Paul, W9AC

From kd5byb at kd5byb.net Sun Sep 15 18:03:40 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 15 Sep 2013 17:03:40 -0500
Subject: [BoatAnchors] bypass and couplers

In-Reply-To: <2785162449097778892@unknownmsgid>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
<001701ceb251$471b0010$4301a8c0@KB6NAX>
<E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
<2785162449097778892@unknownmsgid>
Message-ID: <52362EBC.3080409@kd5byb.net>

I've got an HP 400 VTVM that is awaiting its turn on the bench after I get the HP 412 fixed.

In the 400, ever single Black Ugly capacitor is split open.

thanks and 73,
ben, kd5byb

On 9/15/2013 4:07 PM, MU 4CX250B wrote:

> I found that roughly half of the black beauty capacitors in a KWM1
> were cracked with leaking electrolyte.

From spr at earthlink.net Sun Sep 15 18:47:26 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 15:47:26 -0700
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <9F07B67D57084D8EB79CF3BB3E5BB055@DBTOA000>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
<52362064.3090205@earthlink.net> <9F07B67D57084D8EB79CF3BB3E5BB055@DBTOA000>
Message-ID: <523638FE.7090907@earthlink.net>

Hi Paul,

I agree that effects under 0.1% thd (unless of high order, such as crossover distortion) are probably not audible. Those of us who do pro audio must, however, realize that a studio has maybe hundreds of processes between in and out, and that the distortion and frequency response errors add up by the time you're done.

Small amounts of things like 9th harmonic distortion are surprisingly audible. There is mention of this in the 1953 Radiotyron handbook; it isn't new stuff.

When I choose to mod receiver audio, I go for all low order distortion (ultra-linear or P-P triodes) and low output impedance. This last is probably most relevant to ham use, since if the speaker rings on a noise spike, it makes the noise last longer and decreases intelligibity. Low output impedances damp the speaker and shorten ringing from noise spikes.

For those who think I'm doing massive stuff here, a single octal 6BX7 in p-p makes about 4 nice, clean watts. It doesn't take a lot of hardware. Drop it in the 6V6 socket, change the output transformer, and sneak a phase inverter in somewhere, all reversible.

I don't mod them all like this. My SX-42 is stock, my SX-28 has only a mod to the band limiting filter and a small ultra-linear output transformer. SP600 has the 6BX7 mod. BC-348 is stock, RAO3 not done yet, we'll see.

Regards,

Scott

On 9/15/13 2:53 PM, Paul Christensen wrote:

>> This is NOT audiophoolery. These are readily measurable effects if you have access to an Audio Precision audio analyzer, which is the current state of the art for this kind of measurement. I think the total harmonic distortion measurement floor for these is now about 0.0003%, or maybe even maybe better.
>
> Nice, but I doubt there's an audible difference in double-blind testing. About a year ago, I was engaged in a debate with a good friend of mine over the use of tantalum caps for audio coupling. He rightly pointed out the measured THD specs from the Nichicon datasheets under a typical test set-up. As I recall, there was some additional data comparing TIM (transient IM distortion) between the two types. Yes, the tantalums were worse by a magnitude of roughly two decimal places, but still well under 0.1% THD in Nichicon's test circuit.
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> Despite knowing how "bad" a tantalum is when used as an audio coupling cap, I still happily use them when there's a space constraint. In the 1970s, some prominent high-end consumer (and some professional) audio equipment manufacturers used tantalums when coupling into Lo-Z interstage loads. The world of audio is filled with some pretty wacky science.
>
> As a point of reference, the FCC's THD limit for commercial FM broadcast -- back when there was an annual proof-of-performance requirement and broadcast engineers actually measured these things -- was 3.5% from 50 Hz to 100Hz; 2.5% from 100 Hz to 7.5 KHz; then 3% up to the 15 kHz limit. Analog FM performance is capable of much better numbers today, but stations deliberately degrade performance in pursuit of dial prominence.
>
> I can measure THD down to 0.0015% with my Tektronix AA-501A analyzer when sourced from its mating SG-505 oscillator. I will never hear that level of distortion. And at 0.1% THD, I (any likely all of us), cannot discern even that level at any audible frequency. At 1% THD, I don't

> immediately detect THD up to 5 kHz unless I'm closely conducting a fast
> A-B comparison. THD measurements beyond about 6 kHz are mostly a waste
> of time since the first odd order harmonic is at 18 kHz. Few of us on
> this list will have that kind of acute hearing ability -- any maybe
> never did.
>
> Paul, W9AC
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> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From spr at earthlink.net Sun Sep 15 18:48:53 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 15:48:53 -0700
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <52362EBC.3080409@kd5byb.net>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid> <52362EBC.3080409@kd5byb.net>
Message-ID: <52363955.4040107@earthlink.net>

Folks,

Black Uglies across the 120v line are particularly spectacular!

/scott

On 9/15/13 3:03 PM, Ben Hall wrote:
> I've got an HP 400 VTVM that is awaiting its turn on the bench after I
> get the HP 412 fixed.
>
> In the 400, ever single Black Ugly capacitor is split open.
>
> thanks and 73,
> ben, kd5byb
>
> On 9/15/2013 4:07 PM, MU 4CX250B wrote:

>> I found that roughly half of the black beauty capacitors in a KWM1
>> were cracked with leaking electrolyte.
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From rparker at dccnet.com Mon Sep 16 21:24:39 2013
From: rparker at dccnet.com (Ralph Parker)
Date: Mon, 16 Sep 2013 18:24:39 -0700
Subject: [BoatAnchors] Wayne Green
In-Reply-To: <002001ceb243$cb94c280$4301a8c0@KB6NAX>
References: <1379263297.50917.YahooMailNeo@web161005.mail.bf1.yahoo.com>
Message-ID: <3.0.6.32.20130916182439.00b8c040@pop3.dccnet.com>

>Wayne was a sort of cult hero in ham circles. I remember reading him in 73
>when I was a kid...

I remember reading CQ back in the 50s when Wayne was editor. I quite
enjoyed his touch and his humour.
During the early 73 years, I sometimes thought he was waaayyyy out in left
field (that would more accurately be right field for Wayne), but I found
that over the years he came around to my way of thinking :-)
I was quite interested in his discussions of the moon landings, the 'plant
growth stimulator' and his other health-related issues.
I think that 73 was a pretty good technical mag in its day. Compared to
todays offerings, even more so.

RIP, Wayne.

Ralph, VE7XF

From spr at earthlink.net Sun Sep 15 21:59:52 2013
From: spr at earthlink.net (Scott Robinson)
Date: Sun, 15 Sep 2013 18:59:52 -0700
Subject: [BoatAnchors] Mail delivery failed: returning message to sender
Message-ID: <52366618.4060902@earthlink.net>

They might have used white grease with lithium salts in it.

/scott

On 9/14/13 6:53 PM, Singley, Rodger wrote:

> Several years ago I installed a 4 element triband quad and an Orion rotator. The Orion uses a microswitch triggered by rotation of the drive motor which sends pulses to the controller unit as the motor runs to track position. About a week after it was up I found the antenna and controller were out of sync. I verified that the antenna hadn't slipped on the mast and the mast hadn't slipped in the motor and then recalibrated and all was good for two days and then again it was close to 20 degrees off. I discovered that whenever there was fog it would lose calibration and while making measurements I found that with the cable unplugged from the controller there was still voltage across the contact lines from the microswitch. The problem was whatever "grease" Orion used in the connector interacted with the metal contacts and moisture to form a weak battery and the stray voltage generated caused the loss of calibration problem. I cleaned out the factory stuff and replaced it with some

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> ood dielectric grease and the problem has never returned.
>
> Rodger WQ9E
>
> Dr. Rodger B. Singley
> Professor of Marketing

From gumbear at pacbell.net Mon Sep 16 01:36:50 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 15 Sep 2013 22:36:50 -0700
Subject: [BoatAnchors] HQ-129X- performance
References: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>
 <5235EEBD.7000600@earthlink.net>
 <2F8E4EE337994B3EA29E44E1DDAFF2AF@VALUED20606295>
 <52361DCD.6030008@earthlink.net>
Message-ID: <002501ceb29f$9d6ccae0$4301a8c0@KB6NAX>

> ....The measurement is simple; the generator is attached to the receiver and the noise output measured. Then the generator is replaced by a resistor of the same value as the antenna impedance that will be connected in actual use. The ratio of the two measurements is made and converted to decibels. This is the noise figure. The closer the two measurements are to zero db the better. ....

Unfortunately, Richard, this explanation inspires credulity. That's because it's incomplete. To reason what you wrote, the quieter the receiver the greater the dB difference in the load resistor noise level and the noise generator noise level. That is counterintuitive..

Instead of connecting a noise source and then replacing it with a resistor let's connect a noise source that represents the antenna resistance. Then we turn the noise source on and off and observe the difference in receiver output level. The more power the noise source provides the more the on and off ouput dB difference. So far it's a non starter.

Let's define noise factor (a voltage ratio on this case) as the input S/N (signal to noise ratio) of the noise source divided by the S/N at the output. Because the receiver adds noise which is carried to the output it follows that the output S/N is a smaller ration than the input S/N. Therefore:

Noise factor F = Si/Ni divided by So/No.

F will always be greater than 1 because there is no such thing as a noiseless receiver. To convert to NF (noise figure) express the ratio in dB.

But the problem is you can only observe the S/N of the output so you must intuit the S/N at the input. That's what makes measuring NF so much fun - right! So how do you "intuit" input S/N?

If you vary the output power of the noise source by say, 3dB, then you will see a similar but less than 3dB change in output level. It is understood by the physics of the emission starved filament the noise output is proportional to the power applied to heat the filament. From that you can deduce that the closer So/No is to Si/Ni the less of a noise contibutor your receiver is.

Going back to the noise source on-off scenario the "off" noise source is the resistor which at room temperature is producing a noise voltage due to electron thermal agitation. You may be familiar with Boltzman's Constant. So to know the change in noise input power the high class guys use a $$$ calibrated noise source. So it's the warm filament for the rest of us.

BTW, when attempting to do a noise figure measurement turn the AVC off so that gain does not change when varying the noise source input just in case the receiver has no or very little delayed AVC.

Arden Allen
KB6NAX

If you pick up a starving dog and
make him prosperous, he will not
bite you. This is the principle
difference between a dog and
a man. -Mark Twain

From gumbear at pacbell.net Mon Sep 16 01:57:15 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 15 Sep 2013 22:57:15 -0700
Subject: [BoatAnchors] Mail delivery failed: returning message to sender
References: <523620F0.3070009@earthlink.net>
 <C059C83336344FD1BC373A6A8C7542F0@DBTOA000>
Message-ID: <004301ceb2a2$18157ab0$4301a8c0@KB6NAX>

> ....Perhaps others can comment on the properties of silver
when used as a cap.

Silver depositied on mica leafs makes for low loss and compact size. The micas are stacked and clamped together by the terminals. There's no other way to connect to the silver platings. In comes the moisture and galvanic corrosion eats the silver away from the terminal contacts. My experience has always been the capacitance becoming unstable causing noise in receiver circuits.

Arden Allen
KB6NAX

From gumbear at pacbell.net Mon Sep 16 02:00:27 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 15 Sep 2013 23:00:27 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid> <52362EBC.3080409@kd5byb.net>
 <52363955.4040107@earthlink.net>
Message-ID: <004401ceb2a2$18868c00$4301a8c0@KB6NAX>

> ....Black Uglies across the 120v line are particularly spectacular!

Where else would you find those as line bypasses? In a Sprague TO-4. I smelled it but didn't know what gear it blew in until I picked up the TO-4 and heard the pieces rattling around inside. 1400 volt ceramics in there now.

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,

and make a friend forever =:-)

From johnmb at nc.rr.com Mon Sep 16 08:18:16 2013
From: johnmb at nc.rr.com (john)
Date: Mon, 16 Sep 2013 08:18:16 -0400
Subject: [BoatAnchors] Wayne Green
In-Reply-To: <3.0.6.32.20130916182439.00b8c040@pop3.dccnet.com>
References: <1379263297.50917.YahooMailNeo@web161005.mail.bf1.yahoo.com>
 <3.0.6.32.20130916182439.00b8c040@pop3.dccnet.com>
Message-ID: <6.2.1.2.2.20130916081325.03ed7b90@pop-server.nc.rr.com>

Good comments. Mr Green certainly was a colorful character. I have to
wonder about many of his "facts" however. I think he was an excellent
marketeer more than anything. I wrote him once about his claim of
"starting the Mensa organization" , and he wrote back and clarified that
he was the first member in the US.

The issues in the mid to late 70s were HUGE (the ones with the index on the
cover). There was a lot of content in those magazines.

RIP es 73 W2NSD/1 de K5MO SK

At 09:24 PM 9/16/2013, Ralph Parker wrote:
> >Wayne was a sort of cult hero in ham circles. I remember reading him in 73
> >when I was a kid...
>
>I remember reading CQ back in the 50s when Wayne was editor. I quite
>enjoyed his touch and his humour.
>During the early 73 years, I sometimes thought he was waaayyyy out in left
>field (that would more accurately be right field for Wayne), but I found
>that over the years he came around to my way of thinking :-)
>I was quite interested in his discussions of the moon landings, the 'plant
>growth stimulator' and his other health-related issues.
>I think that 73 was a pretty good technical mag in its day. Compared to
>todays offerings, even more so.
>
>RIP, Wayne.
>
>Ralph, VE7XF
>
>____
>BoatAnchors mailing list

>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

III

From 1oldlens1 at ix.netcom.com Sun Sep 15 16:10:03 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sun, 15 Sep 2013 13:10:03 -0700
Subject: [BoatAnchors] HQ-129X- performance
References: <20130915152947.TUE1Y.14367.root@hrndva-web03-z02>
 <5235EEBD.7000600@earthlink.net>
Message-ID: <2F8E4EE337994B3EA29E44E1DDAFF2AF@VALUED20606295>

----- Original Message -----
From: "Scott Robinson" <spr at earthlink.net>
To: <boatanchors at theporch.com>
Sent: Sunday, September 15, 2013 10:30 AM
Subject: Re: [BoatAnchors] HQ-129X- performance

> Hi Russ,
>
> It is easy to measure, if you have a calibrated signal
> generator. You tune the genny and radio together and tgurn
> the generator output down until the S/S+N ratio is 10 dB;
> the RF input that makes thi happen is the quoted
> sensitivity. This is generally done at 5 KHZ or so IF BW.
>
> My SX-28 does about 2.5 uV on all bands, now that I have
> fixed the toasted antenna coil primary on one band.   800
> nv is the same a 0.8 uV.
>
> Regadrs,
>
> Scott

There is a standard method for measuring noise on communications receivers. I will describe it below. However, while this method was specified in the handbooks for many receivers it is NOT a true measure of noise. Its main purpose is to determine if a receiver is working properly. The noise output of a receiver is dependent on its bandwidth among other factors. Where the bandwidth and shape factor of two receivers is different the noise measured by the Signal/Signal+noise method can not be used to compare them except very roughly. A better method, and the one mostly used now, is to measure _noise figure_ sometimes called _noise factor_. This is the ratio of the noise output of the receiver compared to the noise that would come from an ideal, noise-free receiver. Because it takes bandwidth and band shape into account, at least for the most part, it can be used to compare receivers of different bandwidths and designs. More below but first the S/S+N method.

The is often measured for a 10X ratio but sometimes for a 10db ratio or a 6db ratio and maybe others. One must be careful about reading what the ratio is supposed to be when making a measurement to be compared to the manufacturer's spec.

The method requires that the signal generator deliver a calibrated voltage to the antenna terminals of the receiver. Most receivers also specify an antenna load. This is sometimes resistive but in some cases is a dummy load of specified composition.

With this load on the antenna terminals the signal generator is set up of the frequency of interest. It is set for 30% modulation at 400 Hz. This combination is almost universal. The receiver is set for manual RF gain and the gain control set at maximum. The output should be terminated in the characteristic impedance of the receiver and a meter put across the load. A speaker can be used. The signal generator output is adjusted for a convenient starting point and the meter is set for a convenient reference level. Then the modulation is turned off and the ratio of modulated to unmodulated measured. Reset the output level of the generator to obtain a new reference level on the output meter. Turn the modulation on again and measure the ratio of levels. Adjust the output of the signal generator to adjust the level if necessary. The signal generator level is used to adjust the output level of the _modulated_ signal and the receiver audio gain to adjust the level of the unmodulated signal. These two are juggled until the desired ratio is achieved. Once you have that read the signal level from the generator, that is the signal level for the signal to noise measurement.

A similar measurement can be made for CW using the BFO. In this case the signal generator is not modulated but the measurements are made with the BFO on for the equivalent of a modulated signal and with it off for the carrier level.

Since the noise output varies with the bandwidth you will find on variable bandwidth receivers the signal to noise ratio will increase as the bandswitch is made more narrow. Even old very noisy receivers with crystal filters will exhibit very good sensitivity when the crystal is in minimum bandwidth. This must be measured using the CW method because usually the bandwidth is too narrow for a modulated signal to be measured correctly (the effective modulation percentage is reduced). Even a receiver like the HQ-129-X will have a high ratio for signals of a fraction of a microvolt when measured with the crystal filter in use.

Noise figure: Noise figure requires a calibrated wide-band noise generator. Because of the physics of a starved filament diode its possible to get a pretty accurate noise generator by calculating the noise.

The measurement is simple; the generator is attached to the receiver and the noise output measured. Then the generator is replaced by a resistor of the same value as the antenna impedance that will be connected in actual use. The ratio of the two measurements is made and converted to decibels. This is the noise figure. The closer the two measurements are to zero db the better. Typical modern communications receivers have NF of around 6 to 8 db, some much better. A receiver with this sort of NF will be limited by atmospheric noise below about 30 Mhz and maybe higher. At VHF UHF and microwave frequencies the NF becomes critical. Since the noise generated in the input stage is partly dependent on temperature one finds various types of cooling arrangements for the amplifier including super cooling with liquid gasses. Getting even a fraction of a db improvement in something like a radio-telescope is worth considerable effort and each fractional improvement becomes more difficult. For HF communications receivers a decent antenna will generally deliver considerably more noise than is generated by the receiver.

A final note; some older receivers have "sensitivity" specs. These are a measure of the modulated RF input needed to deliver a given audio output with all the gain controls at maximum. While it may be useful to check that the receiver gain is normal it is useless as a measure of noise or even the ability of the receiver to detect weak signals. Mostly it was advertising buzz.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From 1oldlens1 at ix.netcom.com Sun Sep 15 23:50:45 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)

Date: Sun, 15 Sep 2013 20:50:45 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <52361971.7010004@kd5byb.net>
Message-ID: <7245FFAC149C42C49B84E36F9703FC23@VALUED20606295>

----- Original Message -----
From: "Ben Hall" <kd5byb at kd5byb.net>
To: <wb3fau55 at neo.rr.com>
Cc: <boatanchors at theporch.com>
Sent: Sunday, September 15, 2013 1:32 PM
Subject: Re: [BoatAnchors] bypass and couplers

> My thoughts...worth about what you've paid for them:
>
> Any modern cap you install today will last far longer than
> any of the old styles. I think it comes down to what you
> like.
>
> I've used metalized polypropylene units by Xicon and
> Panasonic for years. No issues.
>
> Recently, in replacing the caps in my RBA receiver, I used
> Orange Drops simply because you can get them with very
> long leads and I thought I would need the length. (turns
> out I didn't)
>
> In the past, I've used the axial yellow jobs when nothing
> but an axial capacitor would fit.
>
> thanks and 73,
> ben, kd5byb

There is more than one kind of cap called Orange Drop. Sprague made a radial lead capacitor under that brand name at about the same time as the Black Beauty. The cap was also described as using plastic impregnated paper dielectric but not oil filled. These evidently did not have the rapid failure of the BB but I have no idea of the actual life. There are modern plastic caps that are orange colored and have radial leads. The caps I've used recently are of this type. They are smaller than the old "Orange Drop" Sprague caps. Unless you bought someone's old stock I think this is what you got. What is important is the type of dielectric in the cap. Modern plastic caps are of a couple of different types but all are superior to the old paper caps.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From 1oldlens1 at ix.netcom.com Mon Sep 16 00:00:55 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sun, 15 Sep 2013 21:00:55 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid>
Message-ID: <1959664EA707422AA1949F18719D08DD@VALUED20606295>

----- Original Message -----
From: "MU 4CX250B" <4cx250b at miamioh.edu>
To: "Paul Christensen" <w9ac at arrl.net>
Cc: <boatanchors at theporch.com>
Sent: Sunday, September 15, 2013 2:07 PM
Subject: Re: [BoatAnchors] bypass and couplers

>I found that roughly half of the black beauty capacitors in
>a KWM1
> were cracked with leaking electrolyte. Generally, I find
> that they are
> fairly reliable in low-voltage applications, such as
> cathode bypass or
> tone control circuits. As Paul noted, some of them are in
> high demand
> by audiophiles, who like the distortion they introduce in
> vacuum tube
> guitar amplifiers. I routinely replace all of them.
> 73
> Jim W8ZR
>
>> It's hard to believe, but there's a high dollar market
>> for used Sprague Black beauty and Bumblebee paper
>> dielectric caps -- the same type the rest of us gut out
>> of our gear and can't dispose of quickly enough.   I do
>> think that the failure rate among these two types is a

>> bit blown out of proportion. Of all the Black Beauty
>> caps I've measured, only a small number have failed
>> leakage and/or dielectric absorption testing on my
>> Sencore LC 102 analyzer.

Its not electrolyte, that is in electrolytic caps. The original Black Beauty caps, the kind with RMA coded stripes on them, were oil filled. Not a lot of oil and it was supposed to protect them from moisture absorption. Sometimes the oil leaked out of the filler tube due to overheating it when installing the cap but BB's are often found cracked or even with pieces of the casing broken off. Of course, any oil in them doesn't survive.

Sprague made a similar cap called a Telecap, intended for TV service at medium high voltage. These evidently did better than the BB. BB caps began to fail very shortly after manufacture, that's why the military replaced them in the SP-600-JX. The Modification Work Order was dated not long after the sets were manufactured. At the time of the mod Class-1 ceramic capacitors were about the most reliable and have good RF characteristics. For most purposes film capacitors are equal or superior to the ceramics and are better for many low capacitance uses than the Hi-Q type ceramics.

The distortion from BB's in audio equipment is probably from the DC leaking through coupling caps and affecting the bias. Capacitors do not, in general, cause distortion although I suppose some may develop some sort of non-linearity.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From k5apl at yahoo.com Sun Sep 15 15:37:59 2013
From: k5apl at yahoo.com (Wes Bolin)
Date: Sun, 15 Sep 2013 12:37:59 -0700 (PDT)
Subject: [BoatAnchors] HQ-129x and Preamp
Message-ID: <1379273879.85777.YahooMailNeo@web164602.mail.gq1.yahoo.com>

Many years ago I tried to use my receiver on 10 meters.? Heard about nothing.? Put a RME DB-23 pre-amplifier between it and my antenna, and the band became alive with activity.? Made a believer out of me.

?
Wes

From k1lky at earthlink.net Mon Sep 16 15:00:13 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Mon, 16 Sep 2013 15:00:13 -0400
Subject: [BoatAnchors] HQ-129x and Preamp
In-Reply-To: <1379273879.85777.YahooMailNeo@web164602.mail.gq1.yahoo.com>
References: <1379273879.85777.YahooMailNeo@web164602.mail.gq1.yahoo.com>
Message-ID: <E0BDA3C7-6D4F-4B86-8E8C-4ADB18E38004@earthlink.net>

On Sep 15, 2013, at 3:37 PM, Wes Bolin <k5apl at yahoo.com> wrote:

> Many years ago I tried to use my receiver on 10 meters. Heard about nothing.
> Put a RME DB-23 pre-amplifier between it and my antenna, and the band became alive with activity. Made a believer out of me.

Wes,

The DB-23 uses "two stages of low noise, neutralized, broadband push-pull 6J6 amplifiers". It could well be that these tubes and the circuit configuration don't warrant any experimenting with other tube types. Off the top of my head I don't know what 7-pin replacement tubes might bring better performance.

The later 6DJ8 might make some improvement, especially in the first stage, though it's a 9-pin base tube.
The 6ES8 dual triode is touted by Mike KC4TOS in a 2006 post I collected as follows. Tom had asked about better RF amplifier tubes.

"Hands down - the 6ES8 dual triode, Tom. ENR is only 160 ohms. Only remote cutoff triode I know of, one of the last great tube designs. Use a cascode circuit...the tube was intended for it."
This also is a 9-pin not 7-pin tube.

The much older DB-20 uses octal 6K7 tubes, and certainly could use some newer tube types for better noise.

The DB-22A uses 6BA6's. There are for sure easy plug-in replacements for this one and they would likely give much better noise levels without messing much with the circuits. Is the 6GM6 frame grid tube pin compatible?

I wonder if it would be worth while to use newer remote cutoff tubes (6DC6) and feed the receiver AVC line into the preamp/preselector.

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From gumbear at pacbell.net Mon Sep 16 15:10:16 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 16 Sep 2013 12:10:16 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid>
 <1959664EA707422AA1949F18719D08DD@VALUED20606295>
Message-ID: <003201ceb310$a1743800$4301a8c0@KB6NAX>

> ......For most purposes film capacitors are equal or superior to the ceramics and are better for many low capacitance uses than the Hi-Q type ceramics.
>
> The distortion from BB's in audio equipment is probably from the DC leaking through coupling caps and affecting the bias. Capacitors do not, in general, cause distortion although I suppose some may develop some sort of non-linearity.

Regarding ceramic capacitors, there are two general categories, Class 1 and Class 2 dielectrics. They are of two different types of ceramic dielectric technologies. Briefly, the Class 1 types have negligible voltage gradient (capacitance change with voltage). They include the temperature compensating types like COG (NPO), N750, etc. They are considerably larger than Class 2 types. Class 2 types' main reason for existeance is their smaller size but at the cost of having terrible voltage and temperature gradients. The Sprague Hi-Q capacitors belong to Class 2.

Capacitors do cause distortion, mainly phase distortion as capacitance changes with voltage. That is where low voltage gradient capacitors are needed. Capacitors employed for blocking (coupling) and bypassing see very little voltage change, their main purpose is to supply charge. Capacitors employed for frequency determining see lots of voltage change and obviously are poor candidates for tone control circuits in audio equipment.

Two other types of capacitor behavior are relevent although not as critical, dielectric absorption and capacitance change with frequency.

All the audiophoole hogwash about replacing coupling caps to reduce distortion makes money for capacitor purveyors and does nothing measureable for listening ears.

Arden Allen
KB6NAX

I love a dog. He does nothing for political reasons.
-Will Rogers

From gumbear at pacbell.net Mon Sep 16 15:23:11 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 16 Sep 2013 12:23:11 -0700
Subject: [BoatAnchors] HQ-129x and Preamp
References: <1379273879.85777.YahooMailNeo@web164602.mail.gq1.yahoo.com>
 <E0BDA3C7-6D4F-4B86-8E8C-4ADB18E38004@earthlink.net>
Message-ID: <003a01ceb312$38f18a60$4301a8c0@KB6NAX>

> I wonder if it would be worth while to use newer remote cutoff tubes (6DC6) and feed the receiver AVC line into the preamp/preselector.

There is a tradeoff to doing that. It depends mostly on how the receiver handles strong signals. Reducing the preselector gain will help to avoid cross modulation in the receiver RF and mixer stages. But the increased overall gain variation may play havoc with AVC loop stability and require tweaking AVC time constant.

Arden Allen
KB6NAX

Blessed is the person who has earned the love of an old dog.
- Sydney Jeanne Seward

From gumbear at pacbell.net Mon Sep 16 15:27:04 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 16 Sep 2013 12:27:04 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid>
 <1959664EA707422AA1949F18719D08DD@VALUED20606295>
 <003201ceb310$a1743800$4301a8c0@KB6NAX>
Message-ID: <004001ceb312$bc98b230$4301a8c0@KB6NAX>

"Capacitors employed for frequency determining see lots of voltage change
and obviously are poor candidates for tone control circuits in audio
equipment."

I was referring to Class 2 ceramic capacitors.

Arden Allen
KB6NAX

From jharper at secureoutcomes.net Mon Sep 16 15:51:35 2013
From: jharper at secureoutcomes.net (Jack Harper)
Date: Mon, 16 Sep 2013 13:51:35 -0600
Subject: [BoatAnchors] (BA List) Hammarlund HX-500 Transmitter...
Message-ID: <mailman.384.1379361013.350.boatanchors@theporch.com>

Greetings to the List:

As I mentioned before, I am slowly bringing a
Hammarlund HX-500 transmitter back to life.

My goal is for the HX-500 coupled with my R390A
and the TO-Keyer to be the primary rig for the
rest of my not so much remaining life - so, I am
being careful and perhaps a bit overly fanatical
about "getting it right" - and hope to also learn
a thing or two along the way...

Questions:

(a) I am astonished to see that Hammarlund runs
the +780VDC line from the power supply (5R4) up
through the chassis to the 6146 pair simply
through a hole in the chassis steel. The hole was
drilled just slightly larger than the plain red
hookup wire and so literally the only thing that
keeps the +780VDC from the chassis is the old
insulation on that wire - and that insulation is
now wearing through (fan vibration?).

The interesting thing is that under the chassis,
a very nice porcelain standoff with a lug
supports the connection to the power supply
filter choke. But, then the wire for the filtered
HV just zooms up through that drilled hole with
just a few thousandths of clearance around the insulation.

I have a spare HX-500 parts unit and checked that thinking the one that I am working on had been totally hacked - but, it is the same with that red wire just going through a hole in the steel.

I suppose that I am not a very brave soul and so just bought a used porcelain feed-through on eBay and plan to install that by drilling a 3/8" hole through the chassis for the feed-through with proper lugs top and bottom etc with the top inside the RF cage topside.

Question: Am I missing something here?? Why would Hammarlund do that sort of thing on a HV line? Just to save a buck at the orders of a "cost accountant"? Surely not... This certainly reinforces, by the way, the practice of automatically installing a modern 3-way power plug on any boatanchor. One never knows what evil might lurk under the hood...

(b) Hammarlund originally had a 6AL5 rectifier to generate the "bias voltages" (6146 et. al.) but came out with a Service Bulletin in about 1962 that called to replace that tube with a solid state rectifier "to provide instant bias for the 6146 tubes to prevent possible excessive cathode current at power-up" (waiting for the tube to warm). The same mod also called to replace the original pair of 12AX4 rectifiers (for HV) with a single 5R4, which required also a different power transformer.

My HX-500 had that modification made, which essentially meant rebuilding the power supply, which was done. The correct power transformer (by specified stenciled part number) was also installed to replace the old.

The thing that has been throwing me is the fact that the original unmodified schematic had one set of power supply output voltages (there are seven: -100, -50, +350, +780, +300, +215, and +150), but the Service Bulletin had a very different set of power supply output voltages (-90, -45, +270, +780, +230, +150). That does not make sense to me - nothing else in the transmitter was modified by the Service Bulletin.

To make matters worse, someone manually penciled

in different power supply resistor values
(dropping resistors) on the Service Bulletin
schematic (the "new" schematic) - e.g., 750-ohms
instead of the Hammarlund 15-ohms etc.

So, there are three sets of possible
voltage/resistor values - two formal Hammarlund
and one informal penciled in every copy of the
Service Bulletin that I have ever seen.

The HX-500 that I have had the Service Bulletin
mods made and the dropping resistor values are
the ones penciled in (that penciled scanned
schematic, by the way, appears to be the only one
available anywhere on the Internet).

Problem is that the voltages coming out of my
doubly modified power supply are wildly out of
spec (which spec?) - e.g., +360VDC instead of +270VDC etc.

One thing that I have learned on this project is
that I cannot trust the HX-500 documentation -
especially, apparently, as the company began to come to an end.

I begin to believe that the Hammarlund published
output voltages in the Service Bulletin are WRONG
- why would Hammarlund change those output
voltages when nothing else in the transmitter
changed? In addition, whoever did the power
supply mod in my HX-500 fiddled the dropping
resistor values to meet the penciled in values - and gummed the thing up.

So, my theory is that I should get resistor
values in the power supply that generate the
voltages on the original Hammarlund schematic -
and ignore the WRONG voltages specified in the
Service Bulletin. I have done that, though they
are different from what Hammarlund wanted: e.g.,
68-ohms rather than the published 15-ohms - that sort of thing.

Question: Does it make sense for me to get the
output voltages specified in the original
unmodified schematic? I believe the Service Bulletin numbers are bad.

(c) I notice that Hammarlund also left off a
bleeder resistor on the +300VDC section of the
power supply. I have checked the original

schematic and do not see a path for that to bleed
down at power down (i.e., maybe a resistor
somewhere outside the power supply to ground). I
would like to insert a bleeder (40K?). Does that
make sense??? Why would Hammarlund leave off
that bleeder? Again, an evil "cost accountant"...?

I appreciate any input - even those from Hank
that call for me to get yet more vaccinations on
top of the new one I just got for "TubeTesterItis" :)

Regards to the List -

Jack, W?YJ ("Friend to all Things Hammarlund")
Evergreen, Colorado USA

ps - By the way, you can see this transmitter
running at
http://www.youtube.com/watch?v=ybJ1LsCU0xg (as published by the seller).

From navy.radio at gmail.com Mon Sep 16 17:36:39 2013
From: navy.radio at gmail.com (Nick England)
Date: Mon, 16 Sep 2013 17:36:39 -0400
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <004001ceb312$bc98b230$4301a8c0@KB6NAX>
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid>
 <1959664EA707422AA1949F18719D08DD@VALUED20606295>
 <003201ceb310$a1743800$4301a8c0@KB6NAX>
 <004001ceb312$bc98b230$4301a8c0@KB6NAX>
Message-ID: <B76AB866-E93E-41C4-8228-4B34D25B7DF0@gmail.com>

Well I'm confused. IIRC the caps in the usual Baxendall tone control circuit in hi-fi gear has only a volt or two of AF and no DC. Whereas a coupling cap in an amp driver stage might be blocking 350vdc with 50v of AF. Recalled from dim memory as I sold my Audio Cyclopedia at the last hamfest.

Not that I can hear any difference unless a leaky BB is turning the grid way positive and the plate cherry red.

Cheers.
Nick
(phone email acct)

On Sep 16, 2013, at 3:27 PM, "Arden Allen" <gumbear at pacbell.net> wrote:

> "Capacitors employed for frequency determining see lots of voltage change
> and obviously are poor candidates for tone control circuits in audio
> equipment."
>
> I was referring to Class 2 ceramic capacitors.
>
> Arden

From johnmb at nc.rr.com Mon Sep 16 18:56:48 2013
From: johnmb at nc.rr.com (john)
Date: Mon, 16 Sep 2013 18:56:48 -0400
Subject: [BoatAnchors] HQ-129x and Preamp
In-Reply-To: <E0BDA3C7-6D4F-4B86-8E8C-4ADB18E38004@earthlink.net>
References: <1379273879.85777.YahooMailNeo@web164602.mail.gq1.yahoo.com>
 <E0BDA3C7-6D4F-4B86-8E8C-4ADB18E38004@earthlink.net>
Message-ID: <6.2.1.2.2.20130916185532.03ebae10@pop-server.nc.rr.com>

The RME I used was the one that matched their 6900 receiver with my 75A2.
Made a dead band come to life as you say.

John
K5MO

At 03:00 PM 9/16/2013, Roy Morgan wrote:

>On Sep 15, 2013, at 3:37 PM, Wes Bolin <k5apl at yahoo.com> wrote:
>
> > Many years ago I tried to use my receiver on 10 meters. Heard about
> nothing.
> > Put a RME DB-23 pre-amplifier between it and my antenna, and the band
> became alive with activity. Made a believer out of me.
>
>Wes,
>
>The DB-23 uses "two stages of low noise, neutralized, broadband push-pull
>6J6 amplifiers". It could well be that these tubes and the circuit
>configuration don't warrant any experimenting with other tube types. Off
>the top of my head I don't know what 7-pin replacement tubes might bring
>better performance.

>
>The later 6DJ8 might make some improvement, especially in the first stage,
>though it's a 9-pin base tube.
>The 6ES8 dual triode is touted by Mike KC4TOS in a 2006 post I collected
>as follows. Tom had asked about better RF amplifier tubes.
>
>"Hands down - the 6ES8 dual triode, Tom. ENR is only 160 ohms. Only
>remote cutoff triode I know of, one of the last great tube designs. Use a
>cascode circuit...the tube was intended for it."
>This also is a 9-pin not 7-pin tube.
>
>
>The much older DB-20 uses octal 6K7 tubes, and certainly could use some
>newer tube types for better noise.
>
>The DB-22A uses 6BA6's. There are for sure easy plug-in replacements for
>this one and they would likely give much better noise levels without
>messing much with the circuits. Is the 6GM6 frame grid tube pin compatible?
>
>I wonder if it would be worth while to use newer remote cutoff tubes
>(6DC6) and feed the receiver AVC line into the preamp/preselector.
>
>Roy
>
>Roy Morgan
>RoyMorgan at alum.mit.edu
>K1LKY Since 1958 - Keep 'em Glowing!
>
>
>
>
>____
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

III

From thompson at mindspring.com Mon Sep 16 19:03:38 2013
From: thompson at mindspring.com (David Thompson)
Date: Mon, 16 Sep 2013 19:03:38 -0400
Subject: [BoatAnchors] [Hammarlund] Hammarlund HX-500 Transmitter...
References: <20130916202232.9BCCE149A42B@mailman.qth.net>
 <5237728E.7450.1042F623@kgordon2006.frontier.com>
Message-ID: <00bc01ceb330$fcb4ea00$fb5d4d0c@yourxb2x7j77gn>

The cost cutting that Jack found in the HX-500 occurred at Hammarlund all along. Lloyd Hammarlund was the man in charge (appointed by the owner at the time) mainly due to his last name
as the Hammarlund name needed to be with Hammarlund even though they were owned by outside interests.

In 1964 I met the Hammarlund team at Mars Hill which included Lloyd Hammarlund, Stu Meyer, W2GHK, Bill W2HEL/4 (Engineering Manager) and Bob Belknap (Marketing). Even though the HX-500 was supposed to be no longer made I saw a whole line of HX-500's in the plant. Belknap said they were made for a South American Country.

Lloyd followed in the footsteps of his father, Oscar in being a penny pincher. If the cost even started to approach the maximum costs then corners were cut. My 1958 HQ-110 had the IF coils wiring merely wrapped tightly around the pins BUT not soldered. Yep, Lloyd was the master at keeping costs low. I assume W2HEL approved the HV wire going through a hole in the chassis rather than
a more costly part.

I met with W4AMJ (ex W2AMJ) in 1994 at his Englewood, Florida home. HE was the last NYC employee and retired in 1970. His name is on most of the SP-600 notes and invented the HC-10 converter that was incorporated into several other Hammarlund receivers in 1957. He was the father of the more modern look of the HQ-100, 110, 145, 170 receivers. If he were still alive today I am sure he could agree with all of Jack's points and provide us with many others. But remember National and even Collins cut corners were they could.

Good luck Jack on bringing the HX-500 to life.

73 Dave K4JRB

From spr at earthlink.net Mon Sep 16 19:40:23 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Mon, 16 Sep 2013 16:40:23 -0700 (GMT-07:00)
Subject: [BoatAnchors] bypass and couplers
Message-ID: <15504808.1379374824344.JavaMail.root@wamui-june.atl.sa.earthlink.net>

Hi Nick,

At most frequencies, coupling caps don't have any *signal* voltage across them. Thus, even if they have a capacitance that varies with the voltage across the cap, said voltage is essentialy constant, so no capacitaance variation.

IN a filter such as a Baxendall or other tone control circuit, there will be a noticeable *signal* voltage across the cap at some frequencies, and if its capacitance varies with voltage, it will have that effect tickled by the variable applied voltage.

Regards,

Scott

-----Original Message-----
>From: Nick England <navy.radio at gmail.com>
>Sent: Sep 16, 2013 2:36 PM
>To: Arden Allen <gumbear at pacbell.net>
>Cc: "boatanchors at theporch.com" <boatanchors at theporch.com>
>Subject: Re: [BoatAnchors] bypass and couplers
>
>Well I'm confused. IIRC the caps in the usual Baxendall tone control circuit in hi-fi gear has only a volt or two of AF and no DC. Whereas a coupling cap in an amp driver stage might be blocking 350vdc with 50v of AF. Recalled from dim memory as I sold my Audio Cyclopedia at the last hamfest.
>
>Not that I can hear any difference unless a leaky BB is turning the grid way positive and the plate cherry red.
>Cheers.
>Nick
>(phone email acct)
>

From gumbear at pacbell.net Mon Sep 16 22:10:36 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 16 Sep 2013 19:10:36 -0700
Subject: [BoatAnchors] bypass and couplers
References: <20130915201557.CT2I1.15658.root@hrndva-web03-z02>
 <001701ceb251$471b0010$4301a8c0@KB6NAX>
 <E02A20E6909F4B1FA2CE08C1AD3DAF96@DBTOA000>
 <2785162449097778892@unknownmsgid>
 <1959664EA707422AA1949F18719D08DD@VALUED20606295>
 <003201ceb310$a1743800$4301a8c0@KB6NAX>
 <004001ceb312$bc98b230$4301a8c0@KB6NAX>
 <B76AB866-E93E-41C4-8228-4B34D25B7DF0@gmail.com>
Message-ID: <002401ceb34d$2466e5a0$4301a8c0@KB6NAX>

> Well I'm confused. IIRC the caps in the usual Baxendall tone control circuit in hi-fi gear has only a volt or two of AF and no DC. Whereas a coupling cap in an amp driver stage might be blocking 350vdc with 50v of AF.
....

What you didn't think about is the voltage across the capacitor. The 50 volt signal you referred to is not across the capacitor, it is with respect to ground. I doubt the voltage across the capacitor varies more than a few tenths of a volt. Let's make a calculation. I'm assuming the 50 volt signal is a sine wave with a peak value of 1.414 x 50 = 71 volts at audio frequencies. Let's do soime calculations. Say the coupling cap is .047uF and the next stage grid resistor is 330K. That would be a time constant of 16 milliseconds. If 71 volts DC (or any voltage) was applied to the capacitor in series with the 330K resistor it would take 80 milliseconds for the capacitor to charge to 99% of the applied voltage. So you can see the voltage change on the capacitor is not abrupt. Now get out the calculator and do the math to find out the impedance of the resistor-capacitor network for various frequencies. Calculate the current that flows in the network for each frequency. From the capacitive reactance for each frequency calculate the voltage across the capacitor. What do you come up with?

Arden Allen
KB6NAX

From gumbear at pacbell.net Mon Sep 16 22:23:19 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 16 Sep 2013 19:23:19 -0700
Subject: [BoatAnchors] bypass and couplers
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
Message-ID: <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX>

> The effects if ceramic caps, especially other than Class-1 is a matter of some controversy. I've found web sites purporting to show spectrum analyzer traces showing distortion:
http://www.dslreports.com/forum/r26989406-Ceramic-vs.-Polystyrene-Capacitor-Distortion-Analysis
 I also found http://sound.westhost.com/articles/capacitors.htm which has a good explanation of the properties of capacitors and suggests that distortion produced by caps is extremely rare.
     Have a look. There are many other sites, a Google search for Capacitor Distortion will get lots of hits.

I'm not going to wrestle with the capacitor distortion tar baby, Rich. I purposely did not mention the various capacitor distortion mechanisms. It's a deep subject I'm not competent to prattle on about.

Arden Allen
KB6NAX

From spr at earthlink.net Tue Sep 17 02:23:03 2013
From: spr at earthlink.net (Scott Robinson)
Date: Mon, 16 Sep 2013 23:23:03 -0700
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX>
Message-ID: <5237F547.5060603@earthlink.net>

Gents,

Once upon a time I had a bill of materials error in a tape head preamp at Dolby. A 0.15 uF cap in a bass filter circuit was incorrectly specified on some copies of the BOM as a ceramic part (X7R dielectric, which is by our local designation definitely a class 2 part). I got at least 0.1% distortion at those frequencies where the filter was active. In my line of work this is gross; when I substituted a mylar cap, the distortion became 0.005% or thereabouts, right where it should be. It took me a while to find and destroy all the erroneous BMO copies...

Ceramic caps of the lots-of-Farads-in-a-small-package varieties make easily measurable distortion when used in filter circuits, and probably as coupling capacitors, too. Their capacitance also has a fairly large temperature coefficient.

Regards,

Scott

On 9/16/13 7:23 PM, Arden Allen wrote:
>> The effects if ceramic caps, especially other than Class-1 is a matter of
> some controversy. I've found web sites purporting to show spectrum analyzer
> traces showing distortion:
> http://www.dslreports.com/forum/r26989406-Ceramic-vs.-Polystyrene-Capacitor-Distortion-Analysis
>   I also found http://sound.westhost.com/articles/capacitors.htm which has a
> good explanation of the properties of capacitors and suggests that
> distortion produced by caps is extremely rare.
>   Have a look. There are many other sites, a Google search for Capacitor
> Distortion will get lots of hits.
>
> I'm not going to wrestle with the capacitor distortion tar baby, Rich. I
> purposely did not mention the various capacitor distortion mechanisms. It's
> a deep subject I'm not competent to prattle on about.
>

> Arden Allen
> KB6NAX
>

From arc5 at ix.netcom.com Tue Sep 17 07:19:19 2013
From: arc5 at ix.netcom.com (David Stinson)
Date: Tue, 17 Sep 2013 06:19:19 -0500
Subject: [BoatAnchors] When is a Cap Not a Cap? Redux
In-Reply-To: <5237F547.5060603@earthlink.net>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
Message-ID: <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>

Some time ago, we had a discussion about "when is 150 pFd NOT 150 pFd."
I had purchased some 100 and 150 pFd ceramics to us in a series-resonant LC circuit
carrying about 10 watts of RF to an antenna.
I believe it was this cap:
http://www.digikey.com/product-detail/en/CK45-R3AD151K-NR/445-2715-ND/1007601
While 150 pFd silver micas from my junk box worked fine,
these brand-new ceramics disappated more than half the power
I sent through them. The whole bunch was worthless for this application.

I wanted to review that thread, but can't find it.
Are there any thoughts on why this is the case,
and how I might avoid this mistake in the future?

From spr at earthlink.net Tue Sep 17 11:10:46 2013
From: spr at earthlink.net (Scott Robinson)
Date: Tue, 17 Sep 2013 08:10:46 -0700
Subject: [BoatAnchors] When is a Cap Not a Cap? Redux
In-Reply-To: <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
Message-ID: <523870F6.6090903@earthlink.net>

Hi,

Well, their definition of "low dissipation " doesn't match mine. The
usual dielectric identifiers (COG, NPO, X7R, Z5U, etc.) are absent from
the data sheet. In general NPO or COG parts are quite good-low tempco,
very low voltage coefficient. I'd only uby parts with those dielectrics

for filter use.

Glad you found something that worked.

Regards,

Scott Robinson

On 9/17/13 4:19 AM, David Stinson wrote:
> Some time ago, we had a discussion about "when is 150 pFd NOT 150 pFd."
> I had purchased some 100 and 150 pFd ceramics to us in a series-resonant
> LC circuit
> carrying about 10 watts of RF to an antenna.
> I believe it was this cap:
> http://www.digikey.com/product-detail/en/CK45-R3AD151K-NR/445-2715-ND/1007601
>
> While 150 pFd silver micas from my junk box worked fine,
> these brand-new ceramics disappated more than half the power
> I sent through them. The whole bunch was worthless for this application.
>
> I wanted to review that thread, but can't find it.
> Are there any thoughts on why this is the case,
> and how I might avoid this mistake in the future?
> ____

From john.shriver at gmail.com Tue Sep 17 07:31:48 2013
From: john.shriver at gmail.com (John Shriver)
Date: Tue, 17 Sep 2013 07:31:48 -0400
Subject: [BoatAnchors] When is a Cap Not a Cap? Redux
In-Reply-To: <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
Message-ID: <1BAAFD2A-AC40-40A0-A2F6-E872D2E9561B@gmail.com>

Well, the primary focus for them appears to be as IC bypass caps. Wonder if you were putting more current through them than they were designed for? Not in the data sheets.

The data sheets don't give the impedance versus frequency curves for most types. You may have been at an "unfortunate" place on that curve. Although they look to be designed to be very low inductance, so it's hard to believe you would get into the frequencies where they are dominantly inductive.

On Sep 17, 2013, at 7:19 AM, "David Stinson" <arc5 at ix.netcom.com> wrote:

```
> Some time ago, we had a discussion about "when is 150 pFd NOT 150 pFd."
> I had purchased some 100 and 150 pFd ceramics to us in a series-resonant LC
circuit
> carrying about 10 watts of RF to an antenna.
> I believe it was this cap:
> http://www.digikey.com/product-detail/en/CK45-R3AD151K-NR/445-2715-ND/1007601
> While 150 pFd silver micas from my junk box worked fine,
> these brand-new ceramics disappated more than half the power
> I sent through them.  The whole bunch was worthless for this application.
>
> I wanted to review that thread, but can't find it.
> Are there any thoughts on why this is the case,
> and how I might avoid this mistake in the future?
> _______________________________________________
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
```

```
From wb3fau55 at neo.rr.com  Mon Sep 16 18:37:08 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Mon, 16 Sep 2013 22:37:08 +0000
Subject: [BoatAnchors] bypass and couplers
In-Reply-To: <004401ceb2a2$18868c00$4301a8c0@KB6NAX>
Message-ID: <20130916223708.DQMI1.22403.root@hrndva-web03-z02>

funny though,  you can sell bumble-bees and black beauties on ebay for big bucks.
---- Arden Allen <gumbear at pacbell.net> wrote:
> > ....Black Uglies across the 120v line are particularly spectacular!
>
> Where else would you find those as line bypasses?  In a Sprague TO-4.  I
> smelled it but didn't know what gear it blew in until I picked up the TO-4
> and heard the pieces rattling around inside.  1400 volt ceramics in there
> now.
>
> Arden Allen
> KB6NAX
>
> Adopt a shelter dog,
> save an innocent life,
> and make a friend forever =:-)
>
> _______________________________________________
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
```

From n7rk at cox.net Tue Sep 17 19:24:28 2013
From: n7rk at cox.net (David Hollander)
Date: Tue, 17 Sep 2013 16:24:28 -0700
Subject: [BoatAnchors] [ARC5] [National] [Boatanchors] Wayne Green,
 W2NSD, Dead at 91.
In-Reply-To: <RrEt1m01445oxQM01rFA3i>
References: <AFF591A41CAE419FABA42AEBF26247FD@CompaqSR5710F>
     <SNT148-W19F98A0FA5940E207ED344CA250@phx.gbl>
<6469D8708BF3444FB56B7A60DEA46D72@downstairs>
 <RrEt1m01445oxQM01rFA3i>
Message-ID: <5238E4AC.1010704@cox.net>

Glen Zook wrote:
> I bought my wife a new Ford Falcon station wagon

I guess you didn't really like your wife very much.

From wb3fau55 at neo.rr.com Wed Sep 18 15:57:36 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Wed, 18 Sep 2013 15:57:36 -0400
Subject: [BoatAnchors] [ARC5] [National] [Boatanchors] Wayne Green,
 W2NSD, Dead at 91.
In-Reply-To: <5238E4AC.1010704@cox.net>
Message-ID: <20130918195736.PQPCG.32259.root@hrndva-web03-z02>

that was a few years ago, about 1965?
---- David Hollander <n7rk at cox.net> wrote:
> Glen Zook wrote:
> > I bought my wife a new Ford Falcon station wagon
>
> I guess you didn't really like your wife very much.
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From kd5byb at kd5byb.net Thu Sep 19 18:52:31 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Thu, 19 Sep 2013 17:52:31 -0500
Subject: [BoatAnchors] HP 412A update
In-Reply-To: <523870F6.6090903@earthlink.net>
References: <15311097.1379369230161.JavaMail.root@elwamui-
karabash.atl.sa.earthlink.net>

<002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
<5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
<523870F6.6090903@earthlink.net>
Message-ID: <523B802F.5050203@kd5byb.net>

Good evening all,

An update on the HP 412A VTVM that would slowly drift negative off of zero volts with no input.

In an earlier post, I noted that an HP service note 412A-11A described the addition of a zero adjust control, applicable to serial number 424-14482 and below. Mine is well below this S/N. This service note described the addition of a small terminal board with two diodes and two resistors, and the addition of a 10k pot. Installing the pot required some mechanical modifications - drilling at least three holes.

I didn't want to make such a major modification, so I laid out a small PC board to hold the components that would mount on a stand-off attached to one of the transformer mounting bolts. This is totally reversible.

I received the little board back from the board-house yesterday, installed the 10k ten-turn pot, diodes and resistors and installed it into the unit.

Initial trials were quite positive - I was able to adjust for a zero reading easily.

Extended trials were not quite so positive - after a long enough time turned on, especially with the case installed, I determined that the circuit as implemented didn't have enough range and I still had some residual negative offset.

This isn't surprising to me - the circuit uses a pair of forward biased diodes to put somewhere in the vicinity of +1 to -1 VDC across the 10k pot. I say "in the vicinity" as the parts list called for two specific HP part number diodes and I really don't know what their forward voltage was at the approximately 2 mA going thru them.

Looking around the internet, best I could tell was that there were 60V PIV germanium diodes. I substituted 1N4148's. I'm going to guess that they have less forward voltage at low current than the HP part number diodes.

I am going to experiment a little bit and will report back.

thanks much and 73,
ben, kd5byb

From gumbear at pacbell.net Thu Sep 19 23:01:09 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 19 Sep 2013 20:01:09 -0700
Subject: [BoatAnchors] HP 412A update
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
 <523870F6.6090903@earthlink.net> <523B802F.5050203@kd5byb.net>
Message-ID: <001d01ceb5ae$54d78330$4301a8c0@KB6NAX>

> ......Looking around the internet, best I could tell was that there were
60V
PIV germanium diodes. I substituted 1N4148's. I'm going to guess that
they have less forward voltage at low current than the HP part number
diodes. ......

Ben, I don't have the 412A schematic before me nor the mod circuit. I'm guessing the diodes act as voltage regulators for the offset adjustment mod circuit. The diodes also may play a temperature compensation role. Just guessing. Germanium diodes will have a .1 to .2 volt forward drop at low current. The 1N4148 is a silicon diode and will have a .4 to .5 volt drop at low current, probably closer to .6 vols at 2mA. Operating along the forward conduction knee the voltage will be very temperature sensitive. But this is all speculation on my part. Need to know the circuit. I have the 412A manual for my instrument. All I need to know is the mod circuit.

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,
and make a friend forever =:-)

From jlkolb at jlkolb.cts.com Fri Sep 20 00:24:32 2013
From: jlkolb at jlkolb.cts.com (John Kolb)
Date: Thu, 19 Sep 2013 21:24:32 -0700 (PDT)
Subject: [BoatAnchors] HP 412A update
Message-ID: <20130920042432.4312F1E32@alexander.concentric.com>

I'd recommend using a pair of bandgap references such as the LM385. These would be much more stable than a diode. Available in 1.2 or 2.5V parts in thru-hole or SMT components.

John
KK6IL

At 03:52 PM 9/19/2013, you wrote:

Looking around the internet, best I could tell was that there were 60V PIV
germanium diodes. I substituted 1N4148's. I'm going to guess that they have less
forward voltage at low current than the HP part number diodes.

From navy.radio at gmail.com Fri Sep 20 11:47:00 2013
From: navy.radio at gmail.com (Nick England)
Date: Fri, 20 Sep 2013 11:47:00 -0400
Subject: [BoatAnchors] IF alignment procedure question
Message-ID: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>

I've just started the alignment on a piece of gear with an 800kc 2nd
IF. The manual's procedure has me adding a 200 pf cap across the
secondary of an IF can and peaking the primary, then moving the cap to
the primary side and peaking the secondary.
There's a similar procedure for the 875-900kc 1st IF.

Something like this seems familiar but I can't recall ever actually
doing it before.

Since the IF can has 200pf caps across the coils internally, this
extra 200pf obviously detunes the afflicted winding so there's not
much output from the IF strip to peak. I guess this is done to allow
proper tweaking of the primary and secondary without unwanted
interaction. However, I couldn't see any difference on the peak point
when I tweaked with or without the swamping cap, though.

Does anyone have experience where this swamping procedure really
matters? Or am I missing something here somewhere?

Thanks,
Nick K4NYW
http://www.navy-radio.com/xmtrs/frt5/O91-operation.JPG

From gumbear at pacbell.net Fri Sep 20 17:55:07 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Fri, 20 Sep 2013 14:55:07 -0700
Subject: [BoatAnchors] IF alignment procedure question
References: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>
Message-ID: <003e01ceb64c$190c2880$4301a8c0@KB6NAX>

> ....Does anyone have experience where this swamping procedure really matters? Or am I missing something here somewhere?

Nick, it's the dirty little secret of IF tranformer alignment conumdrums. Two resonant tanks in close proximity couple their magnetic fields causing energy to be transferred from one to the other. By varying the distance between the coils you vary the **coefficient of coupling.** The bandwidth and shape factor at the output of the pair also depends on the driving and terminating impedances for the input and output tanks respectively, which also effects the coefficient of coupling. The lower the impedances the lower the Q of the tanks which widens bandwidth and reducew couplint. By selecting the proper input and output impedances and distance between tanks you can get a variety of shape factors from narrow for maximum selectivity to wide and flat topped for accomodation of sidebands. As two tanks tuned to the same frequency are brought closer together a point is reached where the response curve flattens and closer yet devolves into a double peaked response on either side of the resonant frequency. The reason for the dip in the middle is because the input and output loading around the resonant frequency causes decreased coupling. The distance just prior to double peaking is called **critical coupling.** Trying to align two coils for a specified response curve is frustrated by the interactions between the tanks resulting in an improper sharp peaked response because the two tanks are tuned to different frequencies. This can be avoided by aligning by two methods, one by heavily loading one tank with a resistor or greatly detuning it with a capacitor while the other tank is tuned for maxium throughput of an unmodulated signal, the other by sweep aligning the pair to the specified shape and amplitude factor that results by happenstance when the two tanks are at the same frequency. I hope this clears up the mystery.

Arden Allen
KB6NAX

Blessed is the person who has earned the love of an old dog.
- Sydney Jeanne Seward

From rparker at dccnet.com Fri Sep 20 22:28:57 2013
From: rparker at dccnet.com (Ralph Parker)
Date: Fri, 20 Sep 2013 19:28:57 -0700
Subject: [BoatAnchors] IF alignment procedure question
In-Reply-To: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.g>
 <mail.com@eastlink.ca>
Message-ID: <3.0.6.32.20130920192857.00a158f8@pop3.dccnet.com>

>Something like this seems familiar but I can't recall ever actually
>doing it before.

Seems to me I used to do something similar when aligning my Collins S-line,
many years ago. I can't remember if the clip-on was R or C.
After reading Arden's post, I might try it with a couple of rx I have on
the bench.

Ralph, VE7XF

From k1lky at earthlink.net Fri Sep 20 22:44:16 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Fri, 20 Sep 2013 22:44:16 -0400
Subject: [BoatAnchors] IF alignment procedure question
In-Reply-To: <3.0.6.32.20130920192857.00a158f8@pop3.dccnet.com>
References: <3.0.6.32.20130920192857.00a158f8@pop3.dccnet.com>
Message-ID: <AFEDB870-C96A-4681-A620-E059ECE9E7CA@earthlink.net>

On Sep 20, 2013, at 10:28 PM, Ralph Parker <rparker at dccnet.com> wrote:

> Seems to me I used to do something similar when aligning my Collins S-line,
> many years ago. I can't remember if the clip-on was R or C.

Quite possibly both.

The 75S-3-3A manual says, "Make two swamping networks by connection a .01-uf
capacitor in series with a 1000-ohm resistor and connecting alligator clips to the
two remaining leads".

It is the resistor that does the swamping, and the capacitor that keeps the B+
from being shorted to ground.

(The manual also tells how to make a variable level signal source out of the
calibrator with a pot and a cap.)

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From kd5byb at kd5byb.net Sat Sep 21 08:21:29 2013
From: kd5byb at kd5byb.net (Ben Hall)

Date: Sat, 21 Sep 2013 07:21:29 -0500
Subject: [BoatAnchors] HP 412A update
In-Reply-To: <001d01ceb5ae$54d78330$4301a8c0@KB6NAX>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
 <523870F6.6090903@earthlink.net> <523B802F.5050203@kd5byb.net>
 <001d01ceb5ae$54d78330$4301a8c0@KB6NAX>
Message-ID: <523D8F49.3020903@kd5byb.net>

Hi Arden,

Here's a link to the circuit:

<http://www.kd5byb.net/HP412A/zero_adj.jpg>

Some notes:

* The white wire (labeled "to V103 pin 2") connects to the -7 VDC supply in the unit.
* The red-orange wire (labeled "to V104 pin 1") connects to the regulated +150 VDC supply.
* The "to C116" wire connects to the intersection of R120 (108k), C115, and C116.

Agree that on the knee, there is large temperature sensitivity - which is why I think they used two diodes. As long as they are well matched, they should drift equally and the drift will be cancelled out. On my circuit board, the two resistors are right next to each other to lessen any temperature difference there may be between the two.

thanks much and 73,
Ben

On 9/19/2013 10:01 PM, Arden Allen wrote:
> Ben, I don't have the 412A schematic before me nor the mod circuit. I'm guessing the diodes act as voltage regulators for the offset adjustment mod circuit. The diodes also may play a temperature compensation role. Just guessing. Germanium diodes will have a .1 to .2 volt forward drop at low current. The 1N4148 is a silicon diode and will have a .4 to .5 volt drop at low current, probably closer to .6 vols at 2mA. Operating along the forward conduction knee the voltage will be very temperature sensitive. But this is all speculation on my part. Need to know the circuit. I have the 412A manual for my instrument. All I need to know is the mod circuit.

From jp at cs.unc.edu Sat Sep 21 09:30:34 2013

From: jp at cs.unc.edu (john poulton)
Date: Sat, 21 Sep 2013 09:30:34 -0400
Subject: [BoatAnchors] IF alignment procedure question
In-Reply-To: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>
References: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>
Message-ID: <2BE66A7D-05E6-450A-AA68-226DDFD82A96@cs.unc.edu>

Check the alignment of the 51J series of radios. Collins calls for a "swamping circuit" to
detune the primary of each IF whilst adjusting the secondary, and vice-versa. In the 51J's,
the swamping circuit is a series RC network.

I think the swamping circuit DOES matter. If I recall my elementary mechanics, we're dealing
with critically coupled tuned circuits (there's probably a very small capacitor coupling the
prim and sec), and the resulting response is a broadened, flat-topped one.

My guess is: if you were using a sweep generator to do the alignment, you could probably
dispense with the swamping circuit..

The lack of difference between swamped and unswamped leads me to wonder: is the
coupling capacitor missing, perhaps? I've worked on at least one 51J where the previous
owner decided, in his superior wisdom, to remove all of the coupling caps!

73, John

On Sep 20, 2013, at 11:47 AM, Nick England wrote:

> I've just started the alignment on a piece of gear with an 800kc 2nd
> IF. The manual's procedure has me adding a 200 pf cap across the
> secondary of an IF can and peaking the primary, then moving the cap to
> the primary side and peaking the secondary.
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> interaction. However, I couldn't see any difference on the peak point
> when I tweaked with or without the swamping cap, though.
>

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> matters? Or am I missing something here somewhere?
>
> Thanks,
> Nick K4NYW
> http://www.navy-radio.com/xmtrs/frt5/091-operation.JPG
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From anchor at ec.rr.com Sat Sep 21 09:56:22 2013
From: anchor at ec.rr.com (Al Parker)
Date: Sat, 21 Sep 2013 09:56:22 -0400
Subject: [BoatAnchors] IF alignment procedure question
In-Reply-To: <2BE66A7D-05E6-450A-AA68-226DDFD82A96@cs.unc.edu>
References: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>
 <2BE66A7D-05E6-450A-AA68-226DDFD82A96@cs.unc.edu>
Message-ID: <523DA586.3050401@ec.rr.com>

Hi Nick, JP, et al,
     Drake does the same thing, as stated in their manuals.
     JP, that 51J w/o coupling caps sure must have worked great? Maybe as
an audio amp.
73,

Al, W8UT
www.boatanchors.org
www.hammarlund.info

"There is nothing -- absolutely nothing -- half so much
worth doing as simply messing about in boats"
Ratty, to Mole

On 9/21/2013 9:30 AM, john poulton wrote:
> Check the alignment of the 51J series of radios. Collins calls for a "swamping
circuit" to
> detune the primary of each IF whilst adjusting the secondary, and vice-versa.
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> owner decided, in his superior wisdom, to remove all of the coupling caps!
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>
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>> Thanks,
>> Nick K4NYW
>> http://www.navy-radio.com/xmtrs/frt5/O91-operation.JPG
>> ____
>> BoatAnchors mailing list
>> BoatAnchors at theporch.com
>> https://minime.theporch.com/mailman/listinfo/boatanchors
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From kd5byb at kd5byb.net Sat Sep 21 10:22:50 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sat, 21 Sep 2013 09:22:50 -0500
Subject: [BoatAnchors] Capacitor Quandary, re: HP 412
In-Reply-To: <000f01ceb6d1$b5a48040$4301a8c0@KB6NAX>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
 <523870F6.6090903@earthlink.net> <523B802F.5050203@kd5byb.net>
 <001d01ceb5ae$54d78330$4301a8c0@KB6NAX> <523D8F49.3020903@kd5byb.net>
 <000f01ceb6d1$b5a48040$4301a8c0@KB6NAX>
Message-ID: <523DABBA.1010201@kd5byb.net>

Morning all,

I think I may have located the problem in my HP 412A. An 820 pF mica capacitor (C106) in the modulator assembly may be leaky and/or temperature sensitive.

Before I remove it and replace it, I need to get a proper replacement.

The manual lists it as an 820pF mica capacitor, 2% tolerance.

Looking at the capacitor itself, its an EIA color color code, but is a 10% tolerance part.

I have on-hand an 820pF silver mica, a 5% tolerance part.

Thoughts? Getting into and out of the modulator circuit board is kind of a pain...so I'd like to do this once... ;)

thanks,
ben

From kd5byb at kd5byb.net Sat Sep 21 13:26:21 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sat, 21 Sep 2013 12:26:21 -0500
Subject: [BoatAnchors] Capacitor Quandary, re: HP 412
In-Reply-To: <523DABBA.1010201@kd5byb.net>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
 <523870F6.6090903@earthlink.net> <523B802F.5050203@kd5byb.net>
 <001d01ceb5ae$54d78330$4301a8c0@KB6NAX> <523D8F49.3020903@kd5byb.net>
 <000f01ceb6d1$b5a48040$4301a8c0@KB6NAX> <523DABBA.1010201@kd5byb.net>

Message-ID: <523DD6BD.4010004@kd5byb.net>

Good morning all,

Just finished replacing the 820pF mica after the one from my parts
stashed tested very low leakage - 0.013 microamps at 300 VDC.

It's now warming up...

thanks and 73,
ben, kd5byb

On 9/21/2013 9:22 AM, Ben Hall wrote:
> Morning all,
>
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> capacitor (C106) in the modulator assembly may be leaky and/or
> temperature sensitive.
>
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>
> Thoughts? Getting into and out of the modulator circuit board is kind
> of a pain...so I'd like to do this once... ;)
>
> thanks,
> ben
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>
>

From w7qho at aol.com Sat Sep 21 13:30:29 2013
From: w7qho at aol.com (mac)
Date: Sat, 21 Sep 2013 10:30:29 -0700
Subject: [BoatAnchors] IF alignment procedure question
In-Reply-To: <2BE66A7D-05E6-450A-AA68-226DDFD82A96@cs.unc.edu>
References: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>
<2BE66A7D-05E6-450A-AA68-226DDFD82A96@cs.unc.edu>

Message-ID: <DDC14304-732D-4400-B765-BE9314593CB4@aol.com>

The RCA AR-88 manual (194?) describes a manual sweeping procedure to
be followed when aligning the IFs.

Dennis D. W7QHO
Glendale, CA

****
On Sep 21, 2013, at 6:30 AM, john poulton wrote:

> My guess is: if you were using a sweep generator to do the
> alignment, you could probably
> dispense with the swamping circuit..

From kd5byb at kd5byb.net Sat Sep 21 15:32:53 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sat, 21 Sep 2013 14:32:53 -0500
Subject: [BoatAnchors] HP 412 back in service.
In-Reply-To: <523DD6BD.4010004@kd5byb.net>
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
<002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
<5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
<523870F6.6090903@earthlink.net> <523B802F.5050203@kd5byb.net>
<001d01ceb5ae$54d78330$4301a8c0@KB6NAX> <523D8F49.3020903@kd5byb.net>
<000f01ceb6d1$b5a48040$4301a8c0@KB6NAX> <523DABBA.1010201@kd5byb.net>
<523DD6BD.4010004@kd5byb.net>
Message-ID: <523DF465.2090804@kd5byb.net>

Good afternoon all,

The problem is resolved.

With the addition of the zero adjust circuit and replacement of the
820pF mica capacitor, it does hold zero pretty well after about 15
minutes of warm-up time. Once warm, the drift is at most 0.05 volts.
While not perfect, I can live with that. Before, it would pin the meter
negative.

Perhaps more importantly, when I repeated my fan test that earlier
caused the zero point to change, there was no change this time. I never
would have thought a mica capacitor would be so temperature sensitive.

I calibrated it per the procedure in the manual and it compares well
against my other meters in the shack. :)

Anyways, thanks much to all for the help in getting the unit back to operational status.

thanks much and 73,
ben, kd5byb

From gumbear at pacbell.net Sat Sep 21 15:45:29 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 21 Sep 2013 12:45:29 -0700
Subject: [BoatAnchors] Capacitor Quandary, re: HP 412
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
 <002501ceb34d$24e5d9a0$4301a8c0@KB6NAX> <5237F547.5060603@earthlink.net>
 <5DD4EC9DD68944F5B03D9C982839B63F@CompaqSR5710F>
 <523870F6.6090903@earthlink.net> <523B802F.5050203@kd5byb.net>
 <001d01ceb5ae$54d78330$4301a8c0@KB6NAX> <523D8F49.3020903@kd5byb.net>
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Message-ID: <002501ceb703$342e2f70$4301a8c0@KB6NAX>

> .....The manual lists it as an 820pF mica capacitor, 2% tolerance.
....

My manual, serial numbers prefixed 004-, has C106 listed as 10%. The capacitor limits the bandwidth of the chopped signal amplifier and I can see no reason a 5% part would be problematic.

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,
and make a friend forever =:-)

From gumbear at pacbell.net Sat Sep 21 15:50:18 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 21 Sep 2013 12:50:18 -0700
Subject: [BoatAnchors] HP 412 back in service.
References: <15311097.1379369230161.JavaMail.root@elwamui-karabash.atl.sa.earthlink.net>
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<523DD6BD.4010004@kd5byb.net> <523DF465.2090804@kd5byb.net>
Message-ID: <002b01ceb703$cf528640$4301a8c0@KB6NAX>

> ....I never
would have thought a mica capacitor would be so temperature sensitive.
......

Once the capaicitor is infused with moisture and corrosion products all bets are off. Neither wax dipped molded plastic or epoxy dipped caps are hermetically sealed and in time the inevitable occurs. Silver is far from being a noble metal and reacts with everything from soup to nuts.

Arden Allen
KB6NAX

The average dog is a nicer person than
the average person. -Andy Rooney

From wb0eq at yahoo.com Sat Sep 21 16:41:08 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sat, 21 Sep 2013 13:41:08 -0700 (PDT)
Subject: [BoatAnchors] IF alignment procedure question
Message-ID: <1379796068.52680.YahooMailNeo@web161001.mail.bf1.yahoo.com>

These circuits in stock form are no doubt over-coupled to give a specific bandpass shape. ?This wanted shape is that which gives a certain amplitude and phase (group delay) response across its pass band.. ?This is very important in FM receivers (video amps, too, for best transient response) where maximum noise suppression is desired.

Such tuned circuits can NOT be peak aligned. ?Typically a sweep generator is needed to do a sweep alignment.

In some cases a specified alignment load will alter the tuned circuits to a state of critical coupling. ?Those can then just be peak aligned.

Example is General Electric pre-progress line, all tube NBFM radios were aligned like this.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From 1oldlens1 at ix.netcom.com Sat Sep 21 11:16:36 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Sat, 21 Sep 2013 08:16:36 -0700

Subject: [BoatAnchors] IF alignment procedure question
References: <CAB55hNfgxGrf0RNVGBZAx2RO0KvU80V-FN3B9vtkMo3+Pr6Nog@mail.gmail.com>
 <2BE66A7D-05E6-450A-AA68-226DDFD82A96@cs.unc.edu>
Message-ID: <4EA5C15F330C466BA2DEDEFEFFFAD982@VALUED20606295>

----- Original Message -----
From: "john poulton" <jp at cs.unc.edu>
To: "Nick England" <navy.radio at gmail.com>
Cc: "Old Tube Radios" <boatanchors at theporch.com>
Sent: Saturday, September 21, 2013 6:30 AM
Subject: Re: [BoatAnchors] IF alignment procedure question

> Check the alignment of the 51J series of radios. Collins
> calls for a "swamping circuit" to
> detune the primary of each IF whilst adjusting the
> secondary, and vice-versa. In the 51J's,
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>
> I think the swamping circuit DOES matter. If I recall my
> elementary mechanics, we're dealing
> with critically coupled tuned circuits (there's probably a
> very small capacitor coupling the
> prim and sec), and the resulting response is a broadened,
> flat-topped one.
>
> My guess is: if you were using a sweep generator to do the
> alignment, you could probably
> dispense with the swamping circuit..
>
> The lack of difference between swamped and unswamped leads
> me to wonder: is the
> coupling capacitor missing, perhaps? I've worked on at
> least one 51J where the previous
> owner decided, in his superior wisdom, to remove all of
> the coupling caps!
>
> 73, John
>

The IF transformers in the 51J are _overcoupled_ in order to broaden it out a little. One can not just peak the two windings because that would result in the wrong pass band shape. By detuning one winding the mutual coupling is changed enough to allow peaking the other coil at the IF frequency. The technique of decoupling makes it possible to tune the IF without a sweep generator. A combination of over and critically coupled transformers is found in a number of receivers, for instance, the Super-Pro (uses movable coils), the SP-600 (switchable coils), the HQ-120-X and HQ-129-X (fixed coils, needs a sweeper to align), the RCA AR-88 (switchable coils). Some Hallicrafters and other receivers use adjustable coupling but do not use inductive mutual coupling so their pass bands do not expand symmetrically as they are changed.

Collins and Hammarlund got somewhat broader bandwith for good AM but also got improved skirt selectivity via the combination IF.

Many texts discuss coupling but its often not illustrated well. When pure mutual coupling is used there are three states: undercoupled, critically coupled, overcoupled. Critical coupling is the amount of mutual inductance that results in the highest gain at the center frequency and the broadest single peak. As the system moves toward undercoupling both gain and bandwidth are reduced. When the couplign moves toward overcoupling the peak splits, as coupling is increased the two peaks move away from the center frequency and a dip at the center develops. The gain at the center frequency is reduced and then comes back up on the two peaks. A combination of an overcoupled transformer and a critically coupled transformer can result in a fairly broad, nearly flat, response curve.

The expansion of bandwidth is symmetrical only when the coupling is by means of pure mutual inductance. Switchable auxilliary coils will approach this very closely. When capacitance is used to couple the coils the expansion is usually not symmetrical. AFAIK, the only receiver with with variable bandwidth using absolutely pure mutual inductance coupling is the Hammarlund Super-Pro which has mechanically moving coils in the IF.

--
Richard Knoppow
Los Angeles
WB6KBL
dickburk at ix.netcom.com

From navy.radio at gmail.com Sat Sep 21 17:35:23 2013
From: navy.radio at gmail.com (Nick England)
Date: Sat, 21 Sep 2013 17:35:23 -0400
Subject: [BoatAnchors] IF alignment procedure question
In-Reply-To: <1379796068.52680.YahooMailNeo@web161001.mail.bf1.yahoo.com>
References: <1379796068.52680.YahooMailNeo@web161001.mail.bf1.yahoo.com>

Message-ID: <CAB55hNd5L+imMTsgD63jyMbj3SpSgK2POB-3MJpmc_TWT2LDqg@mail.gmail.com>

Many thanks to John, Arden, Richard, et al. for helpful explanations and examples.

I have dim memories of this procedure with an R or RC swamper, but hadn't had it called out for every IF xfmr like this manual says. Just FWIW, the 800kc 2nd IF response curve shown in the manual is pretty narrow, but the 875-900kc 1st IF is indeed shown as the classic double hump of an overcoupled xfmr. I'll go back and redo them both again and see what difference it makes (didn't see much the first time).

In case you are curious, this is part of a Collins 31-tube stabilized master oscillator design - The output signal (from a Master PTO) is multiplied by 5 and then mixed with 25kc harmonics of a xtal standard. The 1st IF extracts one of the products in the 875-900 kc range. This is mixed with a 75-100kc interpolation signal from a second PTO - the result on or about 800kc is sent through the 2nd IF and then divided by 8 to compare against the 100kc xtal standard. The resulting error signal controls a motor-driven AFC cap on the Master PTO. When the 2nd IF signal is exactly 800kc the motor stops. So the overall drift is just 1/40 of the interpolation PTO drift (1/40 because the 600-800kc interpolation PTO really only contributes 0-5kc to the final output.
Block diagram at http://www.navy-radio.com/xmtrs/frt5/O91-operation.JPG

I'm looking forward to seeing this gadget in action...
Cheers,
Nick K4NYW

On Sat, Sep 21, 2013 at 4:41 PM, John Sehring <wb0eq at yahoo.com> wrote:

> These circuits in stock form are no doubt over-coupled to give a specific
> bandpass shape. This wanted shape is that which gives a certain amplitude
> and phase (group delay) response across its pass band.. This is very
> important in FM receivers (video amps, too, for best transient response)
> where maximum noise suppression is desired.
>
> Such tuned circuits can NOT be peak aligned. Typically a sweep generator
> is needed to do a sweep alignment.
>
> In some cases a specified alignment load will alter the tuned circuits to
> a state of critical coupling. Those can then just be peak aligned.
>
> Example is General Electric pre-progress line, all tube NBFM radios were
> aligned like this.
>

> --John Sehring VE6EQR-WB0EQ nr Calgary, Alberta, Canada
>

From gumbear at pacbell.net Sat Sep 21 21:58:09 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 21 Sep 2013 18:58:09 -0700
Subject: [BoatAnchors] IF alignment procedure question
References: <1379796068.52680.YahooMailNeo@web161001.mail.bf1.yahoo.com>
 <CAB55hNd5L+imMTsgD63jyMbj3SpSgK2POB-3MJpmc_TWT2LDqg@mail.gmail.com>
Message-ID: <003701ceb738$038962b0$4301a8c0@KB6NAX>

> ......In case you are curious, this is part of a Collins 31-tube
stabilized
master oscillator design - ....

Anything that can be done digitally can be done analoggy. It just takes tubes to do it.

;-)

Arden Allen
KB6NAX

From gumbear at pacbell.net Sat Sep 21 23:31:43 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sat, 21 Sep 2013 20:31:43 -0700
Subject: [BoatAnchors] Zero voltage offset in HP 412A
Message-ID: <003e01ceb744$48761380$4301a8c0@KB6NAX>

The 412A synchronous chopper modulator-demodulator system is analagous to an operational amplifier. Instead of a straight through DC amplifier with a gain of half a million the gain, as described in the manual, is performed by a capacitively coupled AC amplifier. By using AC amplfication gain and offset drift is virtually eliminated, the AC gain of each stage of the AC amplfier remains nearly constant through the life of the tube, allowing freedom from gain drift and amplification of DC errors. With feedback provided via the gain calibration pot R119 in series with R120 the closed loop gain of the system is 1111 as described in the manual. Not having the schematic representation of the choppers in HP's ordinary 412A manuals makes it hard to compare this circuit to a simple operational amplifier. A download of the Army manual from.....

http://www.hparchive.com/Manuals/HP-412A-AR-Manual.pdf

.....will illucidate the function of the choppers as they are shown in the schematic (thanks be to the services for the work they do to ably train the technicians who maintain military readiness). The photocells in the modulator are alternately switched "on" thereby passing the DC voltage value of first the input voltage and then the feedback voltage thereby establishing the peak-to-peak value of the square wave that drives the AC amplifier. Conversely the the demodulator converts the square wave at the output of the AC amplifier to DC with the bias adjustment setting the output of the cathode follower to zero volts with zero volts applied to the instrument. Capacitor C106 and others comprise frequency compesation for loop stability and meter response characteristics. Assuming both choppers are operating efficiently any distortion of the square wave by a defective AC amplifier will produce unalienable offset problems.

Arden Allen
KB6NAX

From kd5byb at kd5byb.net Sun Sep 22 09:18:38 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 22 Sep 2013 08:18:38 -0500
Subject: [BoatAnchors] Zero voltage offset in HP 412A
In-Reply-To: <003e01ceb744$48761380$4301a8c0@KB6NAX>
References: <003e01ceb744$48761380$4301a8c0@KB6NAX>
Message-ID: <523EEE2E.1050409@kd5byb.net>

Good morning Arden and list,

Thanks much for the explanation of how the modulator and demodulator works in the HP 412A. I think I understand...but I'll admit I'm about three sips into my first cup of coffee. ;)

So correct me if I'm wrong - while its very likely my replacement C106 did correct some (most?) of my drift, I most likely still have something else going on in the AC amplifier as long as the modulator and demodulator are working correctly. I would think that the photocells either work or don't work, no in-between.

It seems like it is time for me to get out the 100X probe and look at the waveforms going into and out of the amplifier, with the unit cold and after warm-up time.

(although an HP 400H AC VTVM is now on the bench - two chemically leaky caps, one burned open resistor, 6 split-open caps in the input attenuator, and a regulated power supply that won't regulate)

What I don't understand is what might be wrong to cause distortion in the amplifier. C108, C109, and C113 are all disk ceramics. Isn't failure of these very unlikely? (C110 has already been replaced with a fresh, new, 50uF electrolytic)

In doing spot-checks of resistors in my unit, I found one that was just barely outside its 5% tolerance and was replaced. So the resistors are not likely suspects either.

It would also seem that another benefit of the AC amplifier is that any accumulation of yuck on the circuit board causing leakage wouldn't cause drift either.

thanks much and 73,
ben, kd5byb

On 9/21/2013 10:31 PM, Arden Allen wrote:
> Capacitor C106 and others comprise frequency compesation for
> loop stability and meter response characteristics. Assuming both choppers
> are operating efficiently any distortion of the square wave by a defective
> AC amplifier will produce unalienable offset problems.

From kd5byb at kd5byb.net Sun Sep 22 09:37:32 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 22 Sep 2013 08:37:32 -0500
Subject: [BoatAnchors] HP 400H VTVM
Message-ID: <523EF29C.8040409@kd5byb.net>

Good morning all,

After declaring success on the 412A yesterday (perhaps prematurely), the $10 Huntsville Hamfest 400H went onto the bench for repair.

This is an early 400H, with a four-digit, no prefix serial number. Manuals for units with a prefix such as 313- have some significant differences, especially in the input attenuator.

Thankfully, I was able to find a manual for my unit, as well as a webpage of guy who has a similar four-digit S/N unit.

Webpage:
<http://richardsears.wordpress.com/2013/06/01/hp-vtvm-400h/>

Manual:
<http://www.kennethkuhn.com/hpmuseum/scans/hp400d_h.pdf>

Externally, the unit is in reasonable shape. Internally, it needs a good bit of work. Initial inspection showed:

1) The six "black uglies" in the input attenuator were all split open.
2) R53 was was burned open
3) C31 and C20 had both leaked electrolyte, leaving corrosion on them and several other components in the vicinity (such as R54)

Repairing the input attenuator required some dis-assembly of the unit. It wasn't as bad as I had thought it would be - unsoldered two wires on the front section of the switch, and cut the rest, knowing the easiest thing to do would be to replace these wires with new ones.

R53, R54, C31, and C20 were all replaced. The unit was powered on (no smoke) and the meter needle erratically bounced around on all ranges. Unit was powered off. The manual has a pretty good troubleshooting section, and with these symptoms, the manual suggested power supply issues.

The rectifier output was within reason - 418 volts or so for the 400 called for in the manual (my line voltage yesterday was about 121 VAC, not 115 VAC as the manual required for this test) so I expected it to be high.

The output of the +250 VDC regulated supply was all over the map - no regulation and it was bouncing around. This is where I stopped for the night.

After a run to wally-world or equivalent this morning to get our son a new shirt for fall pictures, I will pick up here.

Thanks much and 73,
Ben, KD5BYB

From kd5byb at kd5byb.net Sun Sep 22 13:27:27 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Sun, 22 Sep 2013 12:27:27 -0500
Subject: [BoatAnchors] HP 400H VTVM
In-Reply-To: <523EF29C.8040409@kd5byb.net>
References: <523EF29C.8040409@kd5byb.net>
Message-ID: <523F287F.7090207@kd5byb.net>

Good afternoon all,

The 250 VDC supply is now fixed. There was *no solder* between C36 and the one eyelet in which it was installed. Cleaning the years of oxidation off of the lead and the eyelet and adding solder has made the +250 VDC rock solid at 249.9 volts. :)

Now, I'm still getting minor deflection of the meter needle on all ranges, even with the input shunted. It does seem to deflect less on higher ranges, so I'm suspecting something in from of the divider.

On 9/22/2013 8:37 AM, Ben Hall wrote:
> The output of the +250 VDC regulated supply was all over the map - no regulation and it was bouncing around. This is where I stopped for the night.

thanks much and 73,
ben, kd5byb

From jharper at secureoutcomes.net Sun Sep 22 17:53:25 2013
From: jharper at secureoutcomes.net (Jack Harper)
Date: Sun, 22 Sep 2013 15:53:25 -0600
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
In-Reply-To: <mailman.384.1379361013.350.boatanchors@theporch.com>
References: <mailman.384.1379361013.350.boatanchors@theporch.com>
Message-ID: <mailman.110.1379886722.312.boatanchors@theporch.com>

Greetings to the List...

I very much appreciate the terrific advice and counsel that I received from my post of last week. Sorry for the delay in responding, but I was out of town on business.

Something that I did not mention last week is that the Hammarlund HX-500 transmitter worked well for the seller - but it had problems when I got it after it had bounced around in the UPS truck for five days.

The transmitter had zero output into my trusty Cantenna; Two tubes were bad with dead filaments; The power transformer ran too hot to touch; the 6A slo-blo fuse would blow in less than a minute in standby mode; and the power supply voltages were WAY off (e.g., +383VDC for the published +270VDC line and +350VDC for the +230VDC line).

First thing that I did was to recap the transmitter - all electrolytics and paper capacitors. I then carefully checked the transformer for shorts, etc. I then went crazy with "TubeTesterItis" (I am now vaccinated) and checked everything and replaced all tubes with the "best" that I have (after reading Arden's recommended "Getting the Best Out of Tubes", which is excellent, I now better understand the folly of that).

I also went through and checked all of the published tube pin resistances and found and corrected a number of problems there.

The transmitter arrived with a 6146 and a 6146A - it now has two straight 6146 tubes.

One thing that I found is that the Hammarlund documentation, especially the published Service Bulletins, is absolutely loaded with errors.

After an inordinate amount of head scratching over a long period of time, I came to the conclusion last week that the fundamental problem is that a previous owner, decades ago, installed a gaggle of the Service Bulletin fixes, but did not realize that errors are everywhere in the write-ups. For example, he replaced an original 100K resistor with a 220K because even though that step is not in the Service Bulletin for that mod, the parts drawing (not the schematic) showed the 100K at the wrong 220K value - so, he replaced the 100K with the 220K. I found that last night "Round Midnight while tracing circuits, weird resistance values, and re-reading the myriad of Service Bulletins.

However, the worst error that I *think* he made is that he incorrectly rebuilt the power supply according to the Service Bulletin, which eliminated the pair of 12AX4s for a single 5R4 and replaced the 6AL5 with a solid state diode to provide immediate power-up bias to the pair of 6146s. This also called for a different power transformer. All of that work was correct in that he faithfully followed the write-ups.

However, I *believe* that the Service Bulletin new power supply schematic had very wrong output voltages listed - ALL of them are different from the original schematic other than the +780VDC to the finals and the +150VDC regulated (0A2). For example, the three main voltages (+350VDC, +300VDC, and +215VDC) listed on the original unmodified schematic were replaced on the Service Bulletin schematic with +270VDC, +230VDC, and +200VDC. I think he measured the voltages after he made the re-build and realized they did not match the stated modified schematic and then started replacing resistors trying to get closer - however, I think he gave up after awhile and so I ended up with +350VDC instead of +230 and all the rest.

On the modified Service Bulletin schematic that I have, someone penciled in three wildly different resistor values for each of the three dropping power resistors. That modified schematic scan with all the penciling is, by the way, the *only* version that I have seen anywhere.

Last night, I finally came up with a combination - after a lot of head scratching, calculating (I even broke out my old sliderule for the fun of it :), measuring, and trying - of resistor values that work. At least they generate the correct output voltages specified on the original unmodified Hammarlund schematic.

In addition, I installed the ceramic feed-thru for the +780VDC (before, to my astonishment, that HV line just ran through a drilled hole in the chassis) and I also installed a 40K bleeder on one of the power supply electrolytics that Hammarlund did not bother, to my disgust, to do. I also moved one of the three big wattage dropping resistors away from the power supply electrolytics over to the chassis wall with the other two to keep the heat away.

My question is this: Does what I have said about the possible stated bad voltages make sense???

Original published power supply voltages in the original Hammarlund schematic (these are the output voltages that I now have):

(a) -100VDC: Feeds to a separate receiver to silence it on transmit.

(b) -50VDC: Bias to 6146s et. al.

(c) +350VDC: Energizes antenna and vox relay coils.

(d) +780VDC: 6146 plates.

(e) +300VDC: B+

(f) +215VDC: 6146 #2 grids etc.

(g) +150VDC regulated:

Stated output voltages on the Service Bulletin schematic (same order):

(a) -90VDC: Feeds to a separate receiver to silence it on transmit.

(b) -45VDC: Bias to 6146s et. al.

(c) +270VDC: Energizes antenna and vox relay coils.

(d) +780VDC: 6146 plates.

(e) +230VDC: B+

(f) +200VDC: 6146 #2 grids etc.

(g) +150VDC regulated:

Obviously, I have been most concerned about (e).
But, again, in my transmitter, I saw +383VDC for
(e) when I received it with those weird resistors
rather than that stated +230VDC. I now think that
+300VDC is the "correct" value. +383VDC rather
than +300VDC might cause the power transformer to run hot and fuses to blow??

I do point out that the other modifications in
the other Service Bulletins were/are minor -
nothing major has changed to call, for example, a
change of +300VDC down to +230VDC. That's almost a 25% drop...

I *believe* that the tech that drew the Service
Bulletin modified power supply schematic whipped
out his trusty 1000v/ohm vom back in 1963 and
measured kinda-sorta and recorded what he got -
to my enormous confusion fifty years later here in the 21st Century.

I am, by the way, running the HX-500 at a measured 117VAC.

So where am I now?   All power supply output
voltages are as listed in the original schematic;
all tube pin resistance measurements are correct;

power transformer has been checked for shorts
(none); all electrolytic and paper capacitors
replaced; several incorrect resistors have been
replaced; the +780VDC line now runs through the
chassis via a ceramic/porcelain feed-thru;
missing bleeder resistors have been installed;
and all tubes "tested" (whatever that means) and
the dead replaced. ...and I have not yet electrocuted myself :)

Some Good News: I have not blown any fuses lately :)

Next step is to measure tube pin voltages and see
what's what with those. Alas, I am also out of
town this next week on business. No rest for the wicked...

"Soon", I hope to be boiling some oil in the Cantenna! :)

Again, I very much appreciate all those
fascinating comments regarding the HX-500 and its history.

THANK YOU Al/W8UT, Alan/KB6NAX, Bill/KU8H,
Dave/K4JRB, Hank van Cleef, and Ken/W7EKB.

Any further follow-on comments and advice would be greatly appreciated.

Regards to the List from 8,000-feet elevation in
the *still* rainy Rocky Mountains...

Jack, W?YJ ("Friend to all things Hammarlund")
Evergreen, Colorado

From gumbear at pacbell.net Sun Sep 22 18:53:17 2013
From: gumbear at pacbell.net (Arden Allen)

Date: Sun, 22 Sep 2013 15:53:17 -0700
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
References: <mailman.384.1379361013.350.boatanchors@theporch.com>
 <mailman.110.1379886722.312.boatanchors@theporch.com>
Message-ID: <003401ceb7e6$90451290$4301a8c0@KB6NAX>

> ....So where am I now?   ....

In a land of make believe, it seems. It is a well practiced but little known axiom that the design engineering folks and the documentation folks do not talk to each other. "We don't make no damn mistakes"! Heard once is all it takes to sully the reputation of any good and worthy company. I know some of you know what I'm talking about.

Arden Allen
KB6NAX

It would be a horrible world if everything was on two legs.
-Cleveland Amory

From rbsingl at ilstu.edu Sun Sep 22 20:18:06 2013
From: rbsingl at ilstu.edu (Singley, Rodger)
Date: Mon, 23 Sep 2013 00:18:06 +0000
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
In-Reply-To: <003401ceb7e6$90451290$4301a8c0@KB6NAX>
References: <mailman.384.1379361013.350.boatanchors@theporch.com>
 <mailman.110.1379886722.312.boatanchors@theporch.com>
 <003401ceb7e6$90451290$4301a8c0@KB6NAX>
Message-ID: <0DEBF1C8D8437248BE53CD4213B89BD322F0F128@ISUEMBX02.ad.ilstu.edu>

Although these documentation flaws can be maddening it does force the user to develop a deep understanding of both the individual circuit sections and the overall transmitter. Jack, this is what separates you from the mere "appliance operator" and even though it can be frustrating it is one of those truly great learning experiences. Once you slog through something like this it makes future typical repairs and restorations appear very simple. I have been preaching this principle of conquering the difficult and everything else will seem simple to the youth soccer team I was coerced into coaching this season and several of the players have really blossomed once they learn the joy of surprising even themselves with their capabilities.

My own experience with this occurred when I was in the fourth grade and the class took a field trip to a lighthouse. The climb up the open spiral staircase was a bit unnerving but I froze when it was time to climb the 30 foot straight ladder that led to the actual light assembly. Fast forward to my senior year in high school and there was a need for someone to climb the local TV broadcast tower with a 2 meter handheld (which wasn't that small in 1977) to check coverage for a possible repeater site. Once you go up over 800 feet shorter heights don't seem bad at all and I have done a lot of tower work in the ensuing years. The only thing I don't like to do is look up when I am climbing. Years ago I was changing warning lights on a tower in Mississippi and it was one of those days when the scattered clouds were moving rapidly across the sky. I looked up and the upper section of the tower cast against the moving clouds created the perfect optical illusion that the tower was falling-not a fun experience!

Rodger WQ9E

Dr. Rodger B. Singley
Professor of Marketing

> -----Original Message-----
> From: BoatAnchors [mailto:boatanchors-bounces at theporch.com] On Behalf

From wb0eq at yahoo.com Sun Sep 22 20:54:44 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 22 Sep 2013 17:54:44 -0700 (PDT)
Subject: [BoatAnchors] IF alignment procedure question
Message-ID: <1379897684.59023.YahooMailNeo@web161004.mail.bf1.yahoo.com>

After looking at the block diagram of this unit & noting its AFC function, I'm not surprised that it wants to pay attention to the phase response of the unit.

AFC implies frequency swings, better known as frequency modulation.

It's not so easy to measure & see the phase response of tuned circuits. ?Small changes in the amplitude response over its pass band barely noticed can lead to quite a bit of phase misalignment.

Basically, linear phase vs. frequency is wanted in an FM system. ?As group delay is just the math derivative of the phase response, this will lead to constant group delay across the passband and best performance

You may have seen older G.E. NBFM IF strips with stickers over the alignment adjustments, labeled "Phase aligned, do not adjust". ?The early method (which I used) employed an olde style buzzer. ?Its sparking contacts generated very wide band noise. ?The noise was coupled into the radio tuned to a very weak, on-frequency, noisy signal. ?A final touch up on specified tuned circuits minimized the "hash".

Motorola NBFM did not use such an alignment technique. ?It depended on the fixed

response of their famous Permakay IF block filter.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From wb0eq at yahoo.com Sun Sep 22 21:04:42 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 22 Sep 2013 18:04:42 -0700 (PDT)
Subject: [BoatAnchors] Zero voltage offset in HP 412A
Message-ID: <1379898282.67875.YahooMailNeo@web161001.mail.bf1.yahoo.com>

A vital element of the 412's chopper is the that they are synchronous.

The incoming DC signal is first chopped (modulated) into AC, amplifed as AC, then demodulated by the 2nd chopper, which must be synchronous with the 1st chopper. ? Here, doing that is trivial as both choppers are driven by the same motor.

As Arden pointed out, this technique can result in virtually no DC drift. ?AC amps can be compensated & use both AC & DC feedback for stability.

Speaking of HP, there's a book about Collins & Arthur himself. ?Inside is a picture of Art at home in his shack/workshop. ?In front of him is a long line-up of HP stuff on his bench.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From wb0eq at yahoo.com Sun Sep 22 21:19:16 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 22 Sep 2013 18:19:16 -0700 (PDT)
Subject: [BoatAnchors] HP 400H VTVM
Message-ID: <1379899156.32310.YahooMailNeo@web161002.mail.bf1.yahoo.com>

Years ago, when I had less experience, I had an HP 400 AC VM.

It displayed all the usual craziness of instability & drift. ?Yes, the 6CB6's microphony (nice word, eh?) drive me batty.

I was "forced" to go to a solid state HP ACVM 400F which was purchased for the lordly sum of $15. ?It works FB, no issues.

In between I had a pair of HP 403B's. ?Those drove me nuts. ?Among other problems were finding 25 volts of DC from NiCad's. ?And many leaky caps. ?My then-just-purchased ESR meter helped to finally fix the 403 but I was tired of it, so sold it.

I also have a Ballentine 300 ACVM. ?Uses tubes but solid as a rock, no problems. ? This one has the meter movement that is logarithmic in action. ?This is not done electronically but by special design of the meter movement's magnet. ?So, zero is below zero, off scale. ?

This one's perfect & cost only $4! ?Seller told me the dumpster was next if someone didn't buy it. ?

Could I resist? ?No, of course not. ?Maybe what I'm really running here is an orphanage for BA equipment.

I remember Daven meters when I was in Air Force avionics with same kind of movement.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From wb0eq at yahoo.com Sun Sep 22 21:31:30 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Sun, 22 Sep 2013 18:31:30 -0700 (PDT)
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
Message-ID: <1379899890.85848.YahooMailNeo@web161001.mail.bf1.yahoo.com>

I have nothing directly useful to offer on you fixing your HX-500. ?:(>

But, I owned its predecessor, the HX-50 for many years.

I too wrestled with it to just to keep it going. ?It was a mess from conception, thru design and engineering & production. ?I think that there was something terribly wrong in Hammarlund corporate culture.

The paperwork was terrible and, yes, lots of inconsistent service bulletins. ?Drove me buggy.

I called it the Drifty Fifty. ?I never could get the VFO to stay put. ?I'm talking major drift, like a kHz or two between transmissions. ?A contemporary Hallicrafters HT-47 would have been a MUCH better rig.

I replaced -50 with a Drake T-4B in 1994 which has given me no problems since. ?It is not much more than about 8 years newer but performance is excellent even for today's use.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From gumbear at pacbell.net Sun Sep 22 23:06:32 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 22 Sep 2013 20:06:32 -0700
Subject: [BoatAnchors] Zero voltage offset in HP 412A
References: <1379898282.67875.YahooMailNeo@web161001.mail.bf1.yahoo.com>

Message-ID: <006601ceb809$eafda170$4301a8c0@KB6NAX>

> ......As Arden pointed out.......

Thanks for the credit, John, but not necessary.

I should have also pointed out that, as with operational amplifier anlysis, the greater the open loop gain of an amplifier the less dependence on the gain of the amplifier and greater dependence on the closed loop feedback resistor pair for gain stability. The closed loop gain of the 412A system is essentailly totally dependent on the feedback resistors for maintaining calibration accuracy and stability.

Here's a good tutorial:

http://www.ecircuitcenter.com/Circuits/op_aol/op_aol_DC1.htm

Arden Allen
KB6NAX

If you get to thinking you're a person of
some influence, try ordering somebody
else's dog around. -Will Rogers

From gumbear at pacbell.net Sun Sep 22 23:04:53 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 22 Sep 2013 20:04:53 -0700
Subject: [BoatAnchors] IF alignment procedure question
References: <1379897684.59023.YahooMailNeo@web161004.mail.bf1.yahoo.com>
Message-ID: <005501ceb809$afd1c5e0$4301a8c0@KB6NAX>

Sorry, we were unable to deliver your message to the following address.

<boatanchors at theporch.com>:
No MX or A records for theporch.com

--- Below this line is a copy of the message.

Received: from [216.39.60.173] by nm11.access.bullet.mail.gq1.yahoo.com with NNFMP; 23 Sep 2013 02:43:29 -0000
Received: from [67.195.22.116] by tm9.access.bullet.mail.gq1.yahoo.com with NNFMP; 23 Sep 2013 02:43:29 -0000
Received: from [127.0.0.1] by smtp111.sbc.mail.gq1.yahoo.com with NNFMP; 23 Sep 2013 02:43:29 -0000
DKIM-Signature: v=1; a=rsa-sha256; c=relaxed/relaxed; d=pacbell.net;
s=s1024; t=1379904209; bh=Zgo03a3sZYzk7mulYh+xAas5sFSQPUYA4Ezzt/O9Y8c=;
h=X-Yahoo-Newman-Id:X-Yahoo-Newman-Property:X-YMail-OSG:X-Yahoo-SMTP:X-Rocke

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t-Received:Message-ID:From:To:References:Subject:Date:MIME-Version:Content-T
ype:Content-Transfer-Encoding:X-Priority:X-MSMail-Priority:X-Mailer:X-MimeOL
E;
b=UGjCLBb3p0Ks2yroA9FaRIEZDVhKWTN5/Q5T/9NGC+uYbr3/OopRoGUW+DP4rBmOjAg5cEu48B
xvN7JXFOHlAZp2rBJ3B48IfOtjtSA23mFJOu/WMb7JW6fWGq/Mjwhs0U8swGPUceAc1FnptAyeSZ
Rl0bfUnjCYevHK2oLquSY=
X-Yahoo-Newman-Id: 861272.97696.bm at smtp111.sbc.mail.gq1.yahoo.com
X-Yahoo-Newman-Property: ymail-3
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X-Yahoo-SMTP: s8yoNLaswBBu0GfcjHmfZyNJS4ZX4vpNgnwVM3tvakU-
X-Rocket-Received: from KB6NAX (gumbear at 107.206.152.199 with )
        by smtp111.sbc.mail.gq1.yahoo.com with SMTP; 23 Sep 2013 02:43:29
+0000 UTC
Message-ID: <003701ceb806$8b606cf0$4301a8c0 at KB6NAX>
From: "Arden Allen" <gumbear at pacbell.net>
To: "John Sehring" <wb0eq at yahoo.com>,
"Boatanchors List" <boatanchors at theporch.com>
References: <1379897684.59023.YahooMailNeo at web161004.mail.bf1.yahoo.com>
Subject: Re: [BoatAnchors] IF alignment procedure question
Date: Sun, 22 Sep 2013 19:27:35 -0700
MIME-Version: 1.0
Content-Type: text/plain;
charset="iso-8859-1"
Content-Transfer-Encoding: 7bit
X-Priority: 3
X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook Express 6.00.2800.1933
X-MimeOLE: Produced By Microsoft MimeOLE V6.00.2800.1933
```

> ......Basically, linear phase vs. frequency is wanted in an FM system. As group delay is just the math derivative of the phase response, this will lead to constant group delay across the passband and best performance ......

Well stated, John. I'd like to add some specifics. As you are implying, phase distortion, just as with amplitude distortion, produces additional frequencies, harmonic and sum-difference (Fourier said that) Phase distortion is that over the swing of frequency the degree of phase shift does not remain constant with modulation velocity. Freedom from phase distortion requires the degree of phase shift to follow the instantaneous velocity of the modulating cycle. If the rate of frequency change is constant, i.e., its velocity, as with a symmetrical triangle wave, the degree of phase shift remains the same thoughout the cycle. With sine wave modulation the change in degree of phase shift varies sinusoidally along with the amplitude of the modulating cycle.

Arden Allen
KB6NAX

If you pick up a starving dog and
make him prosperous, he will not
bite you. This is the principle
difference between a dog and
a man. -Mark Twain

From gumbear at pacbell.net Sun Sep 22 23:14:05 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Sun, 22 Sep 2013 20:14:05 -0700
Subject: [BoatAnchors] IF alignment procedure question
References: <1379897684.59023.YahooMailNeo@web161004.mail.bf1.yahoo.com>
Message-ID: <00a701ceb80a$f85f9340$4301a8c0@KB6NAX>

> ......Basically, linear phase vs. frequency is wanted in an FM system. As group delay is just the math derivative of the phase response, this will lead to constant group delay across the passband and best performance ......

Well stated, John. I'd like to add some specifics. As you are implying, phase distortion, just as with amplitude distortion, produces additional frequencies, harmonic and sum-difference (Fourier said that) Phase distortion is that over the swing of frequency the degree of phase shift does not remain constant with modulation velocity. Freedom from phase distortion requires the degree of phase shift to follow the instantaneous velocity of the modulating cycle. If the rate of frequency change is constant, i.e., its velocity, as with a symmetrical triangle wave, the degree of phase shift remains the same thoughout the cycle. With sine wave modulation the change in degree of phase shift varies sinusoidally along with the amplitude of the modulating cycle.

Arden Allen
KB6NAX

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make him prosperous, he will not

bite you. This is the principle
difference between a dog and
a man. -Mark Twain

From wb3fau55 at neo.rr.com Sun Sep 22 10:09:52 2013
From: wb3fau55 at neo.rr.com (wb3fau55 at neo.rr.com)
Date: Sun, 22 Sep 2013 10:09:52 -0400
Subject: [BoatAnchors] HP 412 back in service.
In-Reply-To: <002b01ceb703$cf528640$4301a8c0@KB6NAX>
Message-ID: <20130922140952.70W26.74057.root@cdptpa-web02-z01>

hey Arden, silver, being not a noble metal, does that make it worthy as a slave
or serf? [just kidding OM] Russ.
---- Arden Allen <gumbear at pacbell.net> wrote:
> > ....I never
> would have thought a mica capacitor would be so temperature sensitive.
> ......
>
> Once the capaicitor is infused with moisture and corrosion products all bets
> are off. Neither wax dipped molded plastic or epoxy dipped caps are
> hermetically sealed and in time the inevitable occurs. Silver is far from
> being a noble metal and reacts with everything from soup to nuts.
>
> Arden Allen
> KB6NAX
>
> The average dog is a nicer person than
> the average person. -Andy Rooney
>
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors

From jharper at secureoutcomes.net Mon Sep 23 18:49:30 2013
From: jharper at secureoutcomes.net (Jack Harper)
Date: Mon, 23 Sep 2013 16:49:30 -0600
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
Message-ID: <mailman.174.1379976496.312.boatanchors@theporch.com>

Greetings to the List...

...a brief update on the Hammarlund HX-500 transmitter.

After getting all of the resistance checks and power supply output voltages correct, I fired the transmitter up last night just in standby mode so that I could start to check tube pin voltages.

The Good News is that the power transformer now runs almost cold to the touch - rather than the blistering hot that it was doing before - literally, was too hot to touch - +200F?

I believe that it was a combination of things that caused that high current draw: Way too high B+ voltage cruising everywhere; possibly a leaky electrolytic here and there; and several incorrect resistor values. The power transformer is now barely warm to the touch after 30-minutes in standby.

However, after about 30-minutes of being powered up, I suddenly heard a faint crackling noise and saw a thin trail of smoke whispering up. I immediately pulled the plug and looked for damaged resistors/capacitors etc - but found nothing.

I finally got my nerve up and powered it back up - and no more smoke etc. Everything seems fine - I checked the power supply voltages and they are all as before. I left it powered up staring at it for smoke for 30-minutes: Nothing...

I did do some chassis drilling to mount the +780VDC ceramic feed-thru and also to mount the high-wattage dropping resistor away from the filter electrolytics.

I did my best to carefully remove with a damp paper towel and then blow all of the metal filings out - but was not man enough to "shake" upside down the 80-pound chassis.

I wonder if a filing got across something and finally shorted/heated after 30-minutes. Perhaps, it worked its way out when I tilted the chassis back down (it was on its side when it started to smoke).

However, perhaps I managed to destroy a resistor/capacitor that is now permanently open - so, no more smoke...

I know the general area inside the underside of the chassis where the smoke came from - and have carefully looked at everything - but, saw nothing damaged, cracked, split, blackened, etc.

When I was a 14-year old kid back in the 1960's with my Elmer (Frank, W5DYO - long a SK for decades now), he was showing me his Johnson Viking II when there was a sudden BANG like a .22 round from inside the transmitter. Frank immediately powered down and opened the unit. He found a black area up against the chassis side with little blasted glued legs sticking out radially in a circle. Finally figured out that some sort of large spider got in and across the HV. Scared us witless :)

This was not nearly so dramatic - just a wisp of smoke curling upward and a very faint crackling sound...

Regards to the List -

Jack, W?YJ ("Friend to all things Hammarlund" -
even, believe it or not, transmitters :)
Evergreen, Colorado

From anchor at ec.rr.com Mon Sep 23 19:03:15 2013
From: anchor at ec.rr.com (Al Parker)
Date: Mon, 23 Sep 2013 19:03:15 -0400
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
In-Reply-To: <mailman.174.1379976496.312.boatanchors@theporch.com>
References: <mailman.174.1379976496.312.boatanchors@theporch.com>
Message-ID: <5240C8B3.90000@ec.rr.com>

Hi Jack,

A good report, but those wisps of smoke that come and then are gone with no apparent change are disconcerting. It happens.

Sounds like you'll have it on the air soon. I've had mine on the last 2 Sun.s for the CX, fone last wk, CW this. It performs well, even is used (I think I said this b4) as a high powered signal generator, or amplifier driver, when needed in the shop.

If you get a chance, join us on the Vintage Sideband Net, Sun. 2-3 ET, 14292.5 +-. Net ctrls in TX, AL, & NC (me). We've had a cupla HX-500's on b4, and with a little time I can get mine on to join you, maybe even with an amp.

73,

Al, W8UT

www.boatanchors.org
www.hammarlund.info

"There is nothing -- absolutely nothing -- half so much
worth doing as simply messing about in boats"
Ratty, to Mole

On 9/23/2013 6:49 PM, Jack Harper wrote:
> Greetings to the List...
>
> ...a brief update on the Hammarlund HX-500 transmitter.
>
> After getting all of the resistance checks and power supply output
> voltages correct, I fired the transmitter up last night just in standby
> mode so that I could start to check tube pin voltages.
>
> The Good News is that the power transformer now runs almost cold to the
> touch - rather than the blistering hot that it was doing before -
> literally, was too hot to touch - +200F?
>
> I believe that it was a combination of things that caused that high
> current draw: Way too high B+ voltage cruising everywhere; possibly a
> leaky electrolytic here and there; and several incorrect resistor
> values. The power transformer is now barely warm to the touch after
> 30-minutes in standby.
>
> However, after about 30-minutes of being powered up, I suddenly heard a
> faint crackling noise and saw a thin trail of smoke whispering up. I
> immediately pulled the plug and looked for damaged resistors/capacitors
> etc - but found nothing.
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> etc. Everything seems fine - I checked the power supply voltages and
> they are all as before. I left it powered up staring at it for smoke for
> 30-minutes: Nothing...
>
> I did do some chassis drilling to mount the +780VDC ceramic feed-thru
> and also to mount the high-wattage dropping resistor away from the
> filter electrolytics.
>
> I did my best to carefully remove with a damp paper towel and then blow
> all of the metal filings out - but was not man enough to "shake" upside
> down the 80-pound chassis.
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> I wonder if a filing got across something and finally shorted/heated
> after 30-minutes. Perhaps, it worked its way out when I tilted the
> chassis back down (it was on its side when it started to smoke).
>

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>
> This was not nearly so dramatic - just a wisp of smoke curling upward and a very faint crackling sound...
>
>
> Regards to the List -
>
> Jack, W?YJ ("Friend to all things Hammarlund" - even, believe it or
> not, transmitters :)
> Evergreen, Colorado
>

From kd5byb at kd5byb.net Mon Sep 23 20:14:24 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Mon, 23 Sep 2013 19:14:24 -0500
Subject: [BoatAnchors] HP 400H - back to the beginning
Message-ID: <5240D960.8000504@kd5byb.net>

Good evening all,

So as I'm on the treadmill this afternoon, I'm thinking to myself:

"As Arden noted, this 400H is a 4 MHz video amplifier so some needle deflection is normal. But I'm getting a lot more deflection than I'd expect to be normal, more than several divisions, and it's really spiky sometimes, jumping up 1/3 scale deflection at times. I need to start from scratch and use the scope to see if I can figure out where this spiky noise is coming from."

So that's what I did. The HP manual notes something to the effect that erratic meter movement on all scales could be a power supply problem, so I got out the Tek 465M, my 10X probe, and started immediately following the rectifier.

I about smacked myself at what I saw and how silly I may be.

While the DMM (my recently acquired Fluke 8600) showed the supply as rock solid stable, the scope showed a much different story - I'm seeing the same peaks in the 400 VDC power line that I see in the meter. Same thing on the regulator 250 VDC line.

"What the heck..." I thought to myself...

Then it occurred to me - to the 8600, that samples maybe a few times a second, it *would* look absolutely stable due to the sample rate. Like I said, I about smacked myself for being an idiot.

I've likely been chasing my tail thinking the power supply is fine when it is not. So...back to working on the power supply...

thanks much and 73,
ben, kd5byb

From gumbear at pacbell.net Mon Sep 23 23:07:26 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 23 Sep 2013 20:07:26 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
References: <5240D960.8000504@kd5byb.net>
Message-ID: <002401ceb8d3$36924950$4301a8c0@KB6NAX>

> ....I about smacked myself at what I saw and how silly I may be.
....

Don't be so hard on yourself, Ben. Troubleshooting is a combination of successive approximation and retracing steps. It ain't a formal science. Hardly what I'd call being silly. I don't think you'll get your idiot papers from this group. Try Facebook ;-)

BTW I think you need to change your Boatanchors address to the new one, boatanchors at minime.theporch.com

When I "reply to all" your boatanchors at theporch.com bounces.

Arden Allen
KB6NAX

The average dog is a nicer person than
the average person. -Andy Rooney

From gumbear at pacbell.net Mon Sep 23 23:07:26 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 23 Sep 2013 20:07:26 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
References: <5240D960.8000504@kd5byb.net>
Message-ID: <002401ceb8d3$36924950$4301a8c0@KB6NAX>

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....

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boatanchors at minime.theporch.com

When I "reply to all" your boatanchors at theporch.com bounces.

Arden Allen
KB6NAX

The average dog is a nicer person than
the average person. -Andy Rooney

From gumbear at pacbell.net Mon Sep 23 23:12:24 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 23 Sep 2013 20:12:24 -0700
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
References: <mailman.174.1379976496.312.boatanchors@theporch.com>
Message-ID: <002501ceb8d3$e88e6760$4301a8c0@KB6NAX>

> .....This was not nearly so dramatic - just a wisp of
> smoke curling upward and a very faint crackling sound.....

This also has happened to me, more than once. A composition resistor overheats and cracks, makes a noise maybe, and lets out just enough smoke to get you all worked up but does not discolor if the fault is only for a moment. You may find it by sniffing through a straw (power off).

Arden Allen
KB6NAX

The great pleasure of a dog is that you

may make a fool of yourself with him
and not only will he not scold you,
but he will make a fool of himself too.
-Samual Butler

From w7qho at aol.com Tue Sep 24 00:52:35 2013
From: w7qho at aol.com (mac)
Date: Mon, 23 Sep 2013 21:52:35 -0700
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
In-Reply-To: <mailman.174.1379976496.312.boatanchors@theporch.com>
References: <mailman.174.1379976496.312.boatanchors@theporch.com>
Message-ID: <F0074C2D-6CB6-47B1-8F10-95440AE05D32@aol.com>

Had something like that happen to me in an FL-2100B Linear. Loud BANG on power-up and then nothing, no smoke, no repeat and the amp running FB. Opened up the PA compartment and found arc tracks on one of the plate caps and the chassis, a good inch or more apart. No legs or other spider fragments in evidence but always figured an arachnid or other insect the likely culprit.

Dennis D. W7QHO
Glendale, CA

****
On Sep 23, 2013, at 3:49 PM, Jack Harper wrote:

> When I was a 14-year old kid back in the 1960's with my Elmer
> (Frank, W5DYO - long a SK for decades now), he was showing me his
> Johnson Viking II when there was a sudden BANG like a .22 round from
> inside the transmitter. Frank immediately powered down and opened
> the unit. He found a black area up against the chassis side with
> little blasted glued legs sticking out radially in a circle. Finally
> figured out that some sort of large spider got in and across the HV.
> Scared us witless :)

From jp at cs.unc.edu Tue Sep 24 14:50:01 2013
From: jp at cs.unc.edu (John Poulton)
Date: Tue, 24 Sep 2013 14:50:01 -0400 (EDT)
Subject: [BoatAnchors] FS: TM for GRC-26D needs a new home
Message-ID: <alpine.LRH.2.03.1309241447460.28620@cs.unc.edu>

I have a decent original Operator's Manual for the GRC-26D communications group. Was going to ebay the thing, but ebay won't let me. Evidently this document is on some restricted list, even though it's about 50 years old!

Anyhow: It's yours for $10 shipped to you (in US).

73, John K4OZY

From gumbear at pacbell.net Tue Sep 24 16:53:34 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Tue, 24 Sep 2013 13:53:34 -0700
Subject: [BoatAnchors] Tektronix parts guy
Message-ID: <1e1101ceb968$256f6dc0$4301a8c0@KB6NAX>

Somewhere in my inbox jumble is the contact info for Deane Kidde, the Tektronix parts guy, that one of you sent me, and my forgettery has erased who it was. Can someone supply? Thanks.

Arden Allen
KB6NAX

From k1lky at earthlink.net Tue Sep 24 17:18:36 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Tue, 24 Sep 2013 17:18:36 -0400
Subject: [BoatAnchors] Tektronix parts guy
In-Reply-To: <1e1101ceb968$256f6dc0$4301a8c0@KB6NAX>
References: <1e1101ceb968$256f6dc0$4301a8c0@KB6NAX>
Message-ID: <8D010E60-0F4F-43B0-B18B-FAFC240D2221@earthlink.net>

On Sep 24, 2013, at 4:53 PM, Arden Allen <gumbear at pacbell.net> wrote:

> Somewhere in my inbox jumble is the contact info for Deane Kidde, the Tektronix parts guy, that one of you sent me, and my forgettery has erased who it was. Can someone supply? Thanks.

This is from my Tek notes, recorded in 2001:

Try this fellow, a former Tek employee who sells Tek parts and manuals:

Deane E. Kidd, W7TYR
27270 SW Ladd Hill Road
Sherwood, OR 97140
Tel: 503-625-7363
(this is currently shown in QRZ)

He probably can supply you with the answers you need.

Here's another fellow who may be helpful:

Bob Garcia
845 Fairfield Drive
Marietta, GA 30068-2619
Tel: 1-770-977-5701

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From W0EOM at aol.com Tue Sep 24 17:19:58 2013
From: W0EOM at aol.com (W0EOM at aol.com)
Date: Tue, 24 Sep 2013 17:19:58 -0400 (EDT)
Subject: [BoatAnchors] Tektronix parts guy
Message-ID: <935d0.6fa105d3.3f735bfe@aol.com>

Its possible that Deane is in poor health and no longer living at home.

Will

In a message dated 9/24/2013 2:04:22 P.M. Pacific Daylight Time,
gumbear at pacbell.net writes:

Somewhere in my inbox jumble is the contact info for Deane Kidde, the Tektronix parts guy, that one of you sent me, and my forgettery has erased who it was. Can someone supply? Thanks.

Arden Allen
KB6NAX

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

```
From spr at earthlink.net  Tue Sep 24 17:45:26 2013
From: spr at earthlink.net (Scott Robinson)
Date: Tue, 24 Sep 2013 14:45:26 -0700
Subject: [BoatAnchors] Tektronix parts guy
In-Reply-To: <935d0.6fa105d3.3f735bfe@aol.com>
References: <935d0.6fa105d3.3f735bfe@aol.com>
Message-ID: <524207F6.3090601@earthlink.net>

Hi Arden,

You might also try Sphere Research in Vancouver.  See

<http://www.sphere.bc.ca/>

Regards,

/scott

On 9/24/13 2:19 PM, W0EOM at aol.com wrote:
> Its possible that Deane is in poor health and no longer living at  home.
>
> Will
>
>
> In a message dated 9/24/2013 2:04:22 P.M. Pacific Daylight Time,
> gumbear at pacbell.net writes:
>
> Somewhere in my inbox jumble is the contact info for Deane Kidde,  the
> Tektronix parts guy, that one of you sent me, and my forgettery has  erased
> who it was.  Can someone supply?  Thanks.
>
> Arden  Allen
> KB6NAX
>
> _______________________________________________
> BoatAnchors  mailing  list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>
> _______________________________________________
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>


From kd5byb at kd5byb.net  Tue Sep 24 19:30:39 2013
From: kd5byb at kd5byb.net (Ben Hall)
```

Date: Tue, 24 Sep 2013 18:30:39 -0500
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <002401ceb8d3$36924950$4301a8c0@KB6NAX>
References: <5240D960.8000504@kd5byb.net>
 <002401ceb8d3$36924950$4301a8c0@KB6NAX>
Message-ID: <5242209F.2030703@kd5byb.net>

Hi Arden and gang,

On 9/23/2013 10:07 PM, Arden Allen wrote:

> Don't be so hard on yourself, Ben. Troubleshooting is a combination of successive approximation and retracing steps. It ain't a formal science. Hardly what I'd call being silly. I don't think you'll get your idiot papers from this group. Try Facebook ;-)

:) That makes me feel better - boy and if you can't find something silly on Facebook, YouTube is certainly full of silly...

Up front warning...this is going to be a long post. I do come to a conclusion, sort of.

So while at work today, I came up with the idea of removing all of the tubes from the HP 400H except for the rectifier (6AX5), pass triode (12B4), control tube (6U8), and reference (5651) to see if I still saw garbage in the power supply.

I should note that I did this carefully, with meters hooked to several points as I knew that B+ would shoot way up with no load. I also knew that I'd never get to steady state, so I had to do things quickly.

So, what did I see? With the scope AC-coupled and hooked to the output of the 6AX5, I saw the usual 120 Hz ripple one would expect but also saw that the entire waveform was moving up and down somewhat randomly.

This was both the peaks and valleys. The peak to peak voltage did not change - the entire wave moved up and down the scope screen.

This entire waveform shift really mirrored what I would see on the meter needle (bouncing around) had I had the rest of the tubes installed.

I repeated this several times.

To me, this suggests two things:

1) I've got some line voltage variation here.

and

2) Something is still wrong in the power supply.

In regards to #2, I started thinking that my filter caps were not doing the job, so I tacked in a single 47uF 450 VDC electrolytic across the the 40 uF rectifier reservoir capacitor. Decreased ripple, but still saw the level change. Maybe a little less level shifting, hard to tell. Interesting, I didn't expect this - I thought the level shift should be mostly gone with a fresh cap there.

And I've got the question as to why the voltage regulator isn't taking care of this level change?

Getting back to #1, I rigged up a little test. I got a 12VDC center tapped transformer, two 1N4007 diodes, and a small filter cap. Scope across the filter cap, center tap connected to power line ground - just like a low voltage version of the 400H supply (minus the regulator). With a 47uF cap, the level shift was minimal, perhaps even zero (was out of scope gain), as I'd expect. When I decreased to 1uF, there was the ripple, there was the same random level shift, just on a reduced scale.

So...yes to line voltage noise/variation...and it sure looks like I don't have enough capacitance / bad caps in the HP 400H.

Looking at the power supply schematic, there is a four-section, 20uF each section electrolytic. Section C and D are in parallel, negative to ground, and are the rectifier reservoir caps (cap input supply). Section B filters the output tube plate supply, section A filters the output tube screen. These immediately follow the 12B4 pass tube as voltage flows from the regulator.

Going back in my notes...they show that I saw the power supply level shift in the output tube plate (it connected to the meter thru the crystal diodes to the meter, so makes sense) and screen, saw it in the plate and screen of the amplifier stage just in front of it, and saw it to a lesser extent as I went forward towards the cathode follower input tube.

So, thinking some more...perhaps that whole can is shot - my 47uF was only hung on the reservoir cap, and if the whole can is shot...it's just not enough.

Certainly, had the regulator been fast enough to respond to fast transients...why would you need 20uF of *additional* capacitance on every plate and screen supply of the instrument? So, perhaps I'm just expecting too much from the regulator.

However...the pass tube has a 6.3k resistor across it, plate to cathode, so really, the tube can only do so much, the regulator can only do so much.

So, yes, I am expecting too much from the regulator. I now absolutely
think that I need to replace at least that 4 section electrolytic.

I want to prove this before I do it...so I remove the rectifier, and all
of the voltage regulator tubes. I connect my Eico regulated HV supply
to the +250V bus, turn on the instrument to feed the filaments of the
meter tubes (with a meter across the filament supply in case no HV load
jacks up the filament voltage), and ramp up the Eico to +250V.

So the HP transformer is just powering filaments, the Eico regulated
supply is doing the HV.

I see the same dad-gum level shifting I saw when on the internal
supply!!! Aaahhh!!!

Now, the Eico only has 20uF of output filter capacitor post-regulator
and I cannot remember if or not I've recapped it. Maybe I'm expecting
too much from the Eico as well and maybe it needs repair too.

Or maybe I need a stiff drink. ;)

Bottom line, I think my next step is to replace the four-section can cap
in the HP and see if things improve, unless there is a better suggestion...

thanks much and 73,
ben, kd5byb

From n4osj at bellsouth.net Tue Sep 24 20:00:25 2013
From: n4osj at bellsouth.net (Greg Roecker)
Date: Tue, 24 Sep 2013 20:00:25 -0400
Subject: [BoatAnchors] Tektronix parts guy
In-Reply-To: <1e1101ceb968$256f6dc0$4301a8c0@KB6NAX>
References: <1e1101ceb968$256f6dc0$4301a8c0@KB6NAX>
Message-ID: <24CF7891200245C9ADF88A0A42FE0BA3@bigbadPC>

The to go to in the Atlanta area is Bob Garcia. His contact information is
below:

Bob Garcia/KD4JRT
The Scopeman
845 Fairfield Drive
Marietta, Georgia 30068-2619

770.977.5701

esaronel at bellsouth.net

73,

Greg/n4osj

-----Original Message-----
From: Arden Allen
Sent: Tuesday, September 24, 2013 4:53 PM
To: Old Tube Radios (new)
Subject: [BoatAnchors] Tektronix parts guy

Somewhere in my inbox jumble is the contact info for Deane Kidde, the Tektronix parts guy, that one of you sent me, and my forgettery has erased who it was. Can someone supply? Thanks.

Arden Allen
KB6NAX

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From spr at earthlink.net Tue Sep 24 20:04:35 2013
From: spr at earthlink.net (Scott Robinson)
Date: Tue, 24 Sep 2013 17:04:35 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <5242209F.2030703@kd5byb.net>
References: <5240D960.8000504@kd5byb.net>
 <002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
Message-ID: <52422893.8050908@earthlink.net>

Hi Ben,

Some defective component in the regulator circuit is causing the LF noise. Cap (paper or mica? Flaky resistor? Sub all regulator tubes?

/scott

From bill at iaxs.net Tue Sep 24 20:26:20 2013
From: bill at iaxs.net (Bill Hawkins)
Date: Tue, 24 Sep 2013 19:26:20 -0500
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <5242209F.2030703@kd5byb.net>
References: <5240D960.8000504@kd5byb.net>

<002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
Message-ID: <BC7A155A319B43F99A7F8097F047100C@system072>

Ben,

How much does it vary? How often? Is it regular or random?

Are you using the same oscilloscope for all of your experiments? I remember that the 400H meter goes up and down as well, but is the scope stable with the unloaded output of the Eico supply?

Can you measure any currents?

Bill Hawkins

-----Original Message-----

So, what did I see? With the scope AC-coupled and hooked to the output of the 6AX5, I saw the usual 120 Hz ripple one would expect but also saw that the entire waveform was moving up and down somewhat randomly.

From gumbear at pacbell.net Tue Sep 24 20:45:01 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Tue, 24 Sep 2013 17:45:01 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
References: <5240D960.8000504@kd5byb.net>
<002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
<52422893.8050908@earthlink.net>
Message-ID: <004201ceb988$7daca3c0$4301a8c0@KB6NAX>

Ben, here's a couple of pointers for troubleshooting your power supply problem. Set you scope's trigger source to LINE. The scope will trigger on power line frequency (60Hz) and you will be able to see how efficiently power supply filtering is working. The input filter cap should show sawtooth shape ripple at 120 Hz. The next stage will show much less ripple and more shaped like a sine wave. The third stage practically DC. You may be able to localize the intermittency in the circuitry using the scope. The jumpiness may be due to arcing inside the power transformer or a filter cap. Observe the filter ripple to see if evidence of arcing occurs at approximately voltage maxima. Use a "stethoscope" to listen to the transformer and filters. Select a long blade screwdriver with a handle that comfortably fits your ear to listen to the components.

Arden Allen
KB6NAX

I love a dog. He does nothing for political reasons.
-Will Rogers

From k4pf at juno.com Wed Sep 25 11:22:07 2013
From: k4pf at juno.com (k4pf at juno.com)
Date: Wed, 25 Sep 2013 15:22:07 GMT
Subject: [BoatAnchors] HP 400H - back to the beginning
Message-ID: <20130925.112207.3252.0@webmail06.vgs.untd.com>

> Ben Hall <kd5byb at kd5byb.net> wrote
<sniP>
> With the scope AC-coupled and hooked to the output
of the 6AX5, I saw the usual 120 Hz ripple one would expect but also saw
that the entire waveform was moving up and down somewhat randomly.
This was both the peaks and valleys. The peak to peak voltage did not
change - the entire wave moved up and down the scope screen.
This entire waveform shift really mirrored what I would see on the meter
needle (bouncing around) had I had the rest of the tubes installed.
 <snip>

Hi,

My guess is intermittent heater to cathode leakage in the regulator
pass tubes. If you unplug the pass tubes, does the unregulated d.c.
settle down?

73,
Ed Knobloch

From spr at earthlink.net Wed Sep 25 11:45:07 2013
From: spr at earthlink.net (Scott Robinson)
Date: Wed, 25 Sep 2013 08:45:07 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <20130925.112207.3252.0@webmail06.vgs.untd.com>
References: <20130925.112207.3252.0@webmail06.vgs.untd.com>
Message-ID: <52430503.7050306@earthlink.net>

Hi,

I'd look carefully at the grounding path from power transformer CT tp ground. Don't assume that any riveted connection is still good, and look very carefully at all soldering.

FWIW,

/scott

On 9/25/13 8:22 AM, k4pf at juno.com wrote:
>
>
>
>> Ben Hall <kd5byb at kd5byb.net> wrote
> <sniP>
>> With the scope AC-coupled and hooked to the output
> of the 6AX5, I saw the usual 120 Hz ripple one would expect but also saw
> that the entire waveform was moving up and down somewhat randomly.
> This was both the peaks and valleys. The peak to peak voltage did not
> change - the entire wave moved up and down the scope screen.
> This entire waveform shift really mirrored what I would see on the meter
> needle (bouncing around) had I had the rest of the tubes installed.
>   <snip>
>
> Hi,
>
> My guess is intermittent heater to cathode leakage in the regulator
> pass tubes. If you unplug the pass tubes, does the unregulated d.c.
> settle down?
>
> 73,
> Ed Knobloch
> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From 1oldlens1 at ix.netcom.com Tue Sep 24 19:56:11 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Tue, 24 Sep 2013 16:56:11 -0700 (GMT-07:00)
Subject: [BoatAnchors] HP 400H - back to the beginning
Message-ID: <33266923.1380066971854.JavaMail.root@elwamui-mouette.atl.sa.earthlink.net>

-----Original Message-----
>From: Ben Hall <kd5byb at kd5byb.net>
>Sent: Sep 24, 2013 4:30 PM
>To: Arden Allen <gumbear at pacbell.net>
>Cc: "Old Tube Radios (new)" <boatanchors at minime.theporch.com>
>Subject: Re: [BoatAnchors] HP 400H - back to the beginning
>
>Hi Arden and gang,
>

I am a little confused. Where exactly do you have your external power supply connected to the meter? Is it feeding the filter caps? Do you see the same variation from the external supply when its not connected to the meter?

As far as filter caps, simply bridging a good one across a bad one may not do anything if the bad cap is leaky. Leakage is parallel resistance and will still be there. Low parallel resistance is a common fault in electrolytic caps. In fact, its pretty common in all caps but electrolytics are especially bad since they have fairly high leakage even when new. If you are suspicious of the filter cap assembly I suggest disconnecting it all together and tacking in known good caps to see what that will do.

From john.shriver at gmail.com Tue Sep 24 20:25:04 2013
From: john.shriver at gmail.com (John Shriver)
Date: Tue, 24 Sep 2013 20:25:04 -0400
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <5242209F.2030703@kd5byb.net>
References: <5240D960.8000504@kd5byb.net>
 <002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
Message-ID: <E5C85651-0D4D-43C8-A664-97B67BCE835A@gmail.com>

Or maybe there is some sort of ground loop in your test setup, and the scope would give a wiggly reading if measuring the voltage of a D cell with - connected to the chassis and + connected to the scope probe.

It's all curious -- the multi-section filter caps in my Tek scopes have always been perfect. But maybe HP didn't buy as good one, or their circuits put more stress on them?

Is the entire ground path from the multi-section caps to chassis rock-solid? If that's a semiconductor, trouble will ensue.

From kd5byb at kd5byb.net Wed Sep 25 18:42:26 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Wed, 25 Sep 2013 17:42:26 -0500
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <E5C85651-0D4D-43C8-A664-97B67BCE835A@gmail.com>

References: <5240D960.8000504@kd5byb.net>
<002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
<E5C85651-0D4D-43C8-A664-97B67BCE835A@gmail.com>
Message-ID: <524366D2.7030102@kd5byb.net>

Hi John and list!

On 9/24/2013 7:25 PM, John Shriver wrote:

> Or maybe there is some sort of ground loop in your test setup, and the scope would give a wiggly reading if measuring the voltage of a D cell with - connected to the chassis and + connected to the scope probe.

GREAT suggestion. When I duplicated the behavior with the low voltage transformer, I had convinced myself that I had a line voltage problem. I never thought about a ground loop.

Would two C-cells in series be okay? ;)

I did have a two C-cell holder easily available, so I duplicated the setup using it. Soldered the negative wire to one of the ground points, clipped the probe ground to different point on the meter, and connected the probe clip to the positive.

Even with the 1X probe - it's rock solid.

> It's all curious -- the multi-section filter caps in my Tek scopes have always been perfect. But maybe HP didn't buy as good one, or their circuits put more stress on them?

Same here - never had a bad one in a Tek scope, but have had plenty of bad ones everywhere else. I wouldn't expect HP to buy cheaper capacitors, but its possible.

> Is the entire ground path from the multi-section caps to chassis rock-solid? If that's a semiconductor, trouble will ensue.

Yes - and if I remember correctly, most of the negative connections are not simply thru the "twist lock ears" but also have a wire soldered to the ears to another ground tie point.

thanks much,
ben

From kd5byb at kd5byb.net Wed Sep 25 18:56:06 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Wed, 25 Sep 2013 17:56:06 -0500

Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <BC7A155A319B43F99A7F8097F047100C@system072>
References: <5240D960.8000504@kd5byb.net>
 <002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
 <BC7A155A319B43F99A7F8097F047100C@system072>
Message-ID: <52436A06.6050901@kd5byb.net>

Hi Bill and list,

On 9/24/2013 7:26 PM, Bill Hawkins wrote:

> How much does it vary? How often? Is it regular or random?

With the scope AC-coupled and line triggered, the steady-state variance can be as much as 100 mV from the peak positive excursion to the lowest negative excursion.

At times, there are wild negative excursions that are too fast for me to measure as they go off the screen. 2 volts, maybe?

It varies at less than 10 Hz, but it is completely random in periodicity.

> Are you using the same oscilloscope for all of your experiments?

Yes - my trusty 465M bought from Bob Garcia at the Huntsville Hamfest probably 9 years ago now. :)

> I remember that the 400H meter goes up and down as well, but is
> the scope stable with the unloaded output of the Eico supply?

A *great* question. I just fired up the Eico and the scope - I see the *same* random level shifts in the output of the Eico that I see in the HP 400H power supply.

The Eico schematic is somewhat similar to the HP 400H. One key difference that is immediately apparent is that while the HP 400H grounds the center tap of the B+ winding to chassis, and chassis is connected to the third prong on the AC cord, the Eico schematic doesn't show any portion of the circuitry connected to chassis ground. The Eico does have a three-wire cord and the chassis is connected to the ground prong on the A/C cord.

> Can you measure any currents?

I can, but haven't done any current measurement. I did note that with the Eico powering the 400H, it was drawing about 50 mA, +/- 10 mA.

thanks much,
ben

From kd5byb at kd5byb.net Wed Sep 25 19:07:11 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Wed, 25 Sep 2013 18:07:11 -0500
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <004201ceb988$7daca3c0$4301a8c0@KB6NAX>
References: <5240D960.8000504@kd5byb.net>
 <002401ceb8d3$36924950$4301a8c0@KB6NAX> <5242209F.2030703@kd5byb.net>
 <52422893.8050908@earthlink.net> <004201ceb988$7daca3c0$4301a8c0@KB6NAX>
Message-ID: <52436C9F.8040900@kd5byb.net>

Hi Arden and list,

On 9/24/2013 7:45 PM, Arden Allen wrote:
> Ben, here's a couple of pointers for troubleshooting your power supply
> problem. Set you scope's trigger source to LINE. The scope will trigger on
> power line frequency (60Hz) and you will be able to see how efficiently
> power supply filtering is working. The input filter cap should show
> sawtooth shape ripple at 120 Hz.

I see the saw-tooth wave on the reservoir capacitor - this saw tooth
wave does shift level up and down the screen.

> The next stage will show much less ripple
> and more shaped like a sine wave.

It does - the ripple is almost imperceptible, but the level does shift
up and down. Usually no more than 50 mV, but occasionally it drops out
quickly and violently.

> The third stage practically DC. You may
> be able to localize the intermittency in the circuitry using the scope. The
> jumpiness may be due to arcing inside the power transformer or a filter cap.
> Observe the filter ripple to see if evidence of arcing occurs at
> approximately voltage maxima.

The third stage has no ripple at all, but the level does shift as it did
in the second stage, but that 50 mV is probably no more than 25 mV in
this stage.

It doesn't appear to happen at the voltage maxima - the level shift is
at most 10 Hz in frequency, and while random, is fairly smooth. The
exception is that occasionally I get rather violent negative drop outs
that go off the screen. It is possible that these may coincide with
voltage maxima. These negative drop-outs don't occur more than once
every few seconds, at most.

> Use a "stethoscope" to listen to the
> transformer and filters. Select a long blade screwdriver with a handle that
> comfortably fits your ear to listen to the components.

I will try this - reminds me of Car Talk when Click and Clack tell
people to get out a length of hose to listen to their engines. ;)
There was either a previous message (or a latter one I have read but not
yet responded to) that suggested that the arcing may be in the filter
cap itself. I'll give those a listen too.

thanks much,
ben

From kd5byb at kd5byb.net Wed Sep 25 19:38:22 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Wed, 25 Sep 2013 18:38:22 -0500
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <20130925.112207.3252.0@webmail06.vgs.untd.com>
References: <20130925.112207.3252.0@webmail06.vgs.untd.com>
Message-ID: <524373EE.8020909@kd5byb.net>

Hi Ed,

Another great suggestion! Just tried that - even with the 12B4 removed
I get the same odd level shifting behavior.

I wasn't able to try it for long - without the 12B4 there is less load
on the supply, and I started getting really really close to the rating
of the filter caps in the unit.

The meter needle did do an interesting, repeatable "dance" while I was
doing it.

On 9/25/2013 10:22 AM, k4pf at juno.com wrote:
> My guess is intermittent heater to cathode leakage in the regulator
> pass tubes. If you unplug the pass tubes, does the unregulated d.c.
> settle down?

thanks much and 73,
ben, kd5byb

From wally.gibbons at gmail.com Wed Sep 25 22:51:23 2013
From: wally.gibbons at gmail.com (Wally Gibbons)
Date: Wed, 25 Sep 2013 20:51:23 -0600
Subject: [BoatAnchors] Narco manual wanted, please
Message-ID: <CA+NFokTcJUXLaQ_GqLehgr30Vnzui-DZJc-cpBvDb++6RdNO=w@mail.gmail.com>

Hi,
I was given a Narco Mark 12 aircraft transceiver. With power supply, cabling, and a little heading indicator. I was told it worked when removed.....

I'd like to set this up for just receive on the local unicom frequency. However, when 12 volts is applied, no current drain at all.

If anyone has a manual for this radio, I'd appreciate a contact off list to see if I can arrange for scans or copies of the relevant schematic data.

Thanks, in advance.

Wally Gibbons, WB7ASQ

From hankvc at lostwells.net Thu Sep 26 00:05:04 2013
From: hankvc at lostwells.net (HankVC)
Date: Wed, 25 Sep 2013 22:05:04 -0600 (MDT)
Subject: [BoatAnchors] HP 400H - back to the beginning
In-Reply-To: <5242209F.2030703@kd5byb.net>
Message-ID: <201309260405.r8Q454CP022669@joanne.lostwells.net>

The esteemed Ben Hall has said:

>
> Up front warning...this is going to be a long post. I do come to a conclusion, sort of.
>
> So while at work today, I came up with the idea of removing all of the tubes from the HP 400H except for the rectifier (6AX5), pass triode (12B4), control tube (6U8), and reference (5651) to see if I still saw garbage in the power supply.
>
> I should note that I did this carefully, with meters hooked to several points as I knew that B+ would shoot way up with no load. I also knew that I'd never get to steady state, so I had to do things quickly.
>
> So, what did I see? With the scope AC-coupled and hooked to the output of the 6AX5, I saw the usual 120 Hz ripple one would expect but also saw that the entire waveform was moving up and down somewhat randomly.
>
> This was both the peaks and valleys. The peak to peak voltage did not change - the entire wave moved up and down the scope screen.
>
> This entire waveform shift really mirrored what I would see on the meter needle (bouncing around) had I had the rest of the tubes installed.
>

(most of post snipped)

Ben, your adventures are tickling my memory. I had four or five of the HP 400 series about twenty years ago, and every one of them gave me fits.

B+ doing a St. Vitus Dance is something I remember, and I also remember spending hours trying to figure out what was causing it. My recollection is that "almost anything" will cause it, and that the faults weren't the same in each unit.

So far as the basic power supply is concerned, the filters are for the 120 hz ripple. If that isn't excessive, the caps are OK. The voltage shifts are a much lower frequency, and the filters won't filter them.

One problem item I remember is the heater voltage rheostat on the chassis.

I also recall having to do a lot of scope probing in the 6U8 pass tube control circuit.

If my memory is right, chasing the obvious (the dancing B+) is "fishing in the wrong pond." What worked was to walk up the amplifier stages, taking each tube out of the circuit until I could home in on the area making the noise. There are several methods for doing this:

1. Use a resistor to a positive voltage to jack up the cathode, if the cathode has a bias resistor.
2. Either short the control grid to ground or get a negative voltage on it.
3. With pentodes, ground out the screen voltage.
4. If needed, unsolder wires at tube sockets to jury-rig something that will assure the tube is cut off.

Simply pulling tubes out of sockets generally works, but as I recall this would unbalance things like heater voltages too much.

One thing I remember as being foxy was that needle jumping increased as you switched to higher sensitivity. That was not traced to a problem in the input amplifier.

Another thing I remember about HP stuff is that Micamold caps are nothing but trouble. Another is rivetted grounds that quit grounding properly. HP mechanical construction leaves something to be desired, and I'm thinking "ground faults" as a source of trouble in these beasts.

I can't remember now what the fixes were---one may have been in the 6U8 circuit, but I'm not sure. Make sure the 5651 reference voltage

is stable. But I think you're going to find that you're fishing in
the wrong pond trying to trouble-shoot in the B+ circuit.

Hank

From mike at oldaudio.net Thu Sep 26 13:53:27 2013
From: mike at oldaudio.net (Mike Durff)
Date: Thu, 26 Sep 2013 10:53:27 -0700 (PDT)
Subject: [BoatAnchors] a novel idea...
Message-ID: <1380218007.8074.YahooMailNeo@web5701.biz.mail.ne1.yahoo.com>

I have no relation to this person. If the moderator considers this inappropriate,
please remove with my apologies.

http://cgi.ebay.com/ws/eBayISAPI.dll?
ViewItem&item=221258089444&ssPageName=ADME:X:RTQ:US:1123

From gumbear at pacbell.net Thu Sep 26 14:26:57 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 26 Sep 2013 11:26:57 -0700
Subject: [BoatAnchors] a novel idea...
References: <1380218007.8074.YahooMailNeo@web5701.biz.mail.ne1.yahoo.com>
Message-ID: <000701cebae6$0d7e52b0$4301a8c0@KB6NAX>

> I have no relation to this person. If the moderator considers this
inappropriate, please remove with my apologies.

http://cgi.ebay.com/ws/eBayISAPI.dll?
ViewItem&item=221258089444&ssPageName=ADME:X:RTQ:US:1123

It looks like flies' eyes. That may bug some folks ;-)

Arden Allen
KB6NAX

Adopt a shelter dog,
save an innocent life,
and make a friend forever =:-)

From gumbear at pacbell.net Thu Sep 26 14:41:12 2013
From: gumbear at pacbell.net (Arden Allen)

Date: Thu, 26 Sep 2013 11:41:12 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
References: <201309260405.r8Q454CP022669@joanne.lostwells.net>
Message-ID: <000d01cebae7$fec973b0$4301a8c0@KB6NAX>

> ....Ben, your adventures are tickling my memory. I had four or five of the HP 400 series about twenty years ago, and every one of them gave me fits. ....

My memory was also jogged, Hank. What it brings to mind is similar behavior in goofed up audio amps I've had the unsolicited pleasure to work on. The problem may possibly be the time constant of the power supply and the time constant of Ben's 400H amplifier being too close to equal putting the whoe thing into a marginally unstable situation. Could that have been endemic to the 400 series AC meters? A bunch of hot 6CB6's could push it into that realm I supect. An experiment may help to resolve this, reduce uF's of one or more of the interstage coupling capacitors or increase power supply filter capacitance. The meter may then settle down and not be annoyed by random noise or inteference, especially with the cover off. That and maybe improved AC power input spike suppression. But first all the other million or so possibilities should be eliminated berore doing design change, me thinks. Keep it up Ben!

Arden Allen
KB6NAX

Blessed is the person who has earned the love of an old dog.
- Sydney Jeanne Seward

From spr at earthlink.net Thu Sep 26 15:00:34 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Thu, 26 Sep 2013 12:00:34 -0700 (GMT-07:00)
Subject: [BoatAnchors] HP 400H - back to the beginning
Message-ID: <13060618.1380222034509.JavaMail.root@wamui-june.atl.sa.earthlink.net>

Gents,

The random periodicity of the disturbances in the Force argues against a system oscillation due to time constant matching and a string of really hot 6CB6s. I'm betting on flaky connections somewhere, either inside a part or at a rivet ground.

/scott

-----Original Message-----
>From: Arden Allen <gumbear at pacbell.net>

>Sent: Sep 26, 2013 11:41 AM
>To: HankVC <hankvc at lostwells.net>, Ben Hall <kd5byb at kd5byb.net>
>Cc: boatanchors at theporch.com
>Subject: Re: [BoatAnchors] HP 400H - back to the beginning
>
>> ....Ben, your adventures are tickling my memory. I had four or five of
>the HP 400 series about twenty years ago, and every one of them gave
>me fits. ....
>
>My memory was also jogged, Hank. What it brings to mind is similar behavior
>in goofed up audio amps I've had the unsolicited pleasure to work on. The
>problem may possibly be the time constant of the power supply and the time
>constant of Ben's 400H amplifier being too close to equal putting the whoe
>thing into a marginally unstable situation. Could that have been endemic to
>the 400 series AC meters? A bunch of hot 6CB6's could push it into that
>realm I supect. An experiment may help to resolve this, reduce uF's of one
>or more of the interstage coupling capacitors or increase power supply
>filter capacitance. The meter may then settle down and not be annoyed by
>random noise or inteference, especially with the cover off. That and maybe
>improved AC power input spike suppression. But first all the other million
>or so possibilities should be eliminated berore doing design change, me
>thinks. Keep it up Ben!
>
>Arden Allen
>KB6NAX
>
>Blessed is the person who has earned the love of an old dog.
>- Sydney Jeanne Seward
>
>____
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

From mike at oldaudio.net Thu Sep 26 16:16:36 2013
From: mike at oldaudio.net (Mike Durff)
Date: Thu, 26 Sep 2013 13:16:36 -0700 (PDT)
Subject: [BoatAnchors] connector quandry
Message-ID: <1380226596.95515.YahooMailNeo@web5706.biz.mail.ne1.yahoo.com>

Now that I am in possession of ?RBA-BB-BC sets with two power supplies, I find
that ?the connectors on the RBA & one of the RBC are non standard. ?The RBC-1 uses
a very common 11 pin round connector on both the radio, power supply and
connecting cable. The RBA-1 has been changed to a cinch-jones type on both PS &
radio. The fact that I have three radios and only two supplies complicates matters
further. I've heard that you can run two sets from one supply, but methinks it

would be smarter to run 3 radios from two supplies in parallel, so as to not overtax either supply. At this point, I'm assuming all three radios use the same supply voltages. (I'll look in the manuals before I proceed with this plan).?

Not wanting to bastardize these units any further.??I think building a junction box and installing the mating connectors, to match the already made up cables would be the way to go. The power supply inputs to this junction / distribution box shouldn't be a problem. Now that I think about it, I could hardwire the 2 X PS to the jct/distro box and use the existing cables to connect the radios. That leaves me with one?
RBB-1?with factory connector ?and one extra RBC-5 with factory connector. What to do? Opinions, please...

TNX, Durff

Many thanks to the list for helping me locate these fine radio sets.

From spr at earthlink.net Thu Sep 26 16:45:21 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Thu, 26 Sep 2013 13:45:21 -0700 (GMT-07:00)
Subject: [BoatAnchors] connector quandry
Message-ID: <8397101.1380228322116.JavaMail.root@wamui-june.atl.sa.earthlink.net>

Hi Mike,

My experience wiht Jones connectors is that they don't have enough contact pressure and get noisy and intermittent easily. Tube sockets, such as the 11 pin octals I think you're discussing, have always worked much better for me.

Regards,

Scott

-----Original Message-----
>From: Mike Durff <mike at oldaudio.net>
>Sent: Sep 26, 2013 1:16 PM
>To: "boatanchors at theporch.com" <boatanchors at theporch.com>
>Subject: [BoatAnchors] connector quandry
>
>Now that I am in possession of ?RBA-BB-BC sets with two power supplies, I find that ?the connectors on the RBA & one of the RBC are non standard. ?The RBC-1 uses a very common 11 pin round connector on both the radio, power supply and connecting cable. The RBA-1 has been changed to a cinch-jones type on both PS & radio. The fact that I have three radios and only two supplies complicates matters further. I've heard that you can run two sets from one supply, but methinks it would be smarter to run 3 radios from two supplies in parallel, so as to not overtax either supply. At this point, I'm assuming all three radios use the same

supply voltages. (I'll look in the manuals before I proceed with this plan).?
>
>Not wanting to bastardize these units any further.??I think building a junction box and installing the mating connectors, to match the already made up cables would be the way to go. The power supply inputs to this junction / distribution box shouldn't be a problem. Now that I think about it, I could hardwire the 2 X PS to the jct/distro box and use the existing cables to connect the radios. That leaves me with one?
>RBB-1?with factory connector ?and one extra RBC-5 with factory connector. What to do? Opinions, please...
>
>TNX, Durff
>
>Many thanks to the list for helping me locate these fine radio sets.
>____
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

From k1lky at earthlink.net Thu Sep 26 17:39:41 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Thu, 26 Sep 2013 17:39:41 -0400
Subject: [BoatAnchors] connector quandry
In-Reply-To: <1380226596.95515.YahooMailNeo@web5706.biz.mail.ne1.yahoo.com>
References: <1380226596.95515.YahooMailNeo@web5706.biz.mail.ne1.yahoo.com>
Message-ID: <FC054D42-2949-474D-B1F0-41FFDAB1B47F@earthlink.net>

On Sep 26, 2013, at 4:16 PM, Mike Durff <mike at oldaudio.net> wrote:

> Now that I am in possession of RBA-BB-BC sets with two power supplies, I find that the connectors on the RBA & one of the RBC are non standard.

Mike,

I read just enough of your post to gather that you have two supplies and three radios, and two kinds of supply connectors. Here is what I suggest, based in having an RBB and an RBC, two complete supplies, and only ONE of each cable: the radio to supply one, and the wall power cord one:

- You certainly can run two radios on one supply.. These are military radios meant to run 24/7 for months- years really - at a time and actually on battleships. The manual(s) DO say you can run two radios "in emergency situations" or some such language. That is why there are two power output connectors on each supply. I suggest you measure or look up the B+ current drawn by each radio. (The RBA may draw less than the RBB or RBC, which two will be the same.) and then learn a bit about the available rectifier tubes: 5Y3, 5U4, and the 5R4. The 5R4 uses only 2 amps of filament current but is happy with higher average DC output current than the others (is it 200mA max?). Then run two radios on one supply and see how hot the transformer gets. I bet it will run just fine.

- If you measure the DC resistance of the choke(s) and then the *DC* voltage drop during operation, this will give you a very good measure of the current. Also, if you want to reduce the current demand, and you don't need the full audio output capability, increase the cathode (self-bias) resistance in the audio output tube to reduce the current. (Note: the phones audio output is from a center-tap-grounded balanced transformer - if you feed an external amplifier, don't ground one side of the audio.)

> The RBC-1 uses a very common 11 pin round connector on both the radio, power supply and connecting cable.

Actually, those connectors are not all that common. IF you have or find a bunch of them, please sell me some! (I can use two male cable connectors, or just one, or one and a shell since I do have a male insert that is right.) Wm Perry may have these connectors, but I don't know. He more likely has the shells and clamps and none of the inserts.

> The RBA-1 has been changed to a cinch-jones type on both PS & radio.

Is there one of the original connectors left on the power supply? Does the other supply have both original connectors left on it? Are the connectors on two of the radios fed with Jones connectors both changed?

> The fact that I have three radios and only two supplies complicates matters further. I've heard that you can run two sets from one supply,

Yes, this is for sure true. Do not be afraid to do this. A 5Y3 in the supply may be near its current limit however.

> but methinks it would be smarter to run 3 radios from two supplies in parallel,

If you do that, you may well have trouble - paralleling filament windings can lead to very much imbalanced currents, Same to a lesser degree with the B+ supplies. If your supply power cords are NOT three wire grounded cords, you almost certainly will be able to create a short circuit in either the power circuit or the filament circuit.

> Not wanting to bastardize these units any further. I think building a junction box and installing the mating connectors, to match the already made up cables would be the way to go.

That may well work well: on the box would be two of the original 11-pin MS connectors, one in and one out, and the Jones connector for the changed cable (on the RBA?). Depending one what connector remains or has been replaced on the jones-connected radio(s), you may wind up buying two or three of the MS connectors IF you can find them.

> ...I could hardwire the 2 X PS to the jct/distro box and use the existing cables to connect the radios.

I see trouble trying to parallel two supplies. Better to run two radios on one supply and the third radio on the other supply. Another thought: the power switch for a supply is in the radio - it would be possible for you to set up a short circuit in the power line if you try to parallel two supplies.

Also, ask yourself if you really need to run all three radios at once!
(I know, I'd run my RBB and RBC both at once if I had enough of the right cables!)

PS's:

- If you tire of the RBA in a year, send it to me. Really. (I may not be able to have another radio for a while due to my circumstances.) There may be nothing you want to l listen to below 600 Kc. hehehe

- I will send you off-list my notes file on these radios.

- I do have a complete (with pictures and all pages) manual for the RBB-RBC, in digital form. Most on-line manuals are without pictures and many of the pages.

- If any radio has intermittent band switch operation, just work the switch many times. Getting to the switch for treatment with De-Oxit is not impossible but involves much surgery on the radio.

- I *need* one "Output" (audio) meter - one of mine is not working and has had attempted "repair".

- I *would like* to find one power supply transformer.

- If you run into AGC system problems, let me know, I have hand-written notes on AGC line resistances that may help (not yet included in my notes file).

Yours in RBB/RBC solidarity,

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From k1lky at earthlink.net Thu Sep 26 17:53:38 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Thu, 26 Sep 2013 17:53:38 -0400
Subject: [BoatAnchors] connector quandry
In-Reply-To: <6B55C6DD-AD4E-4228-99EB-912D8DA01AD9@earthlink.net>
References: <8397101.1380228322116.JavaMail.root@wamui-june.atl.sa.earthlink.net>
 <6B55C6DD-AD4E-4228-99EB-912D8DA01AD9@earthlink.net>
Message-ID: <DEBC30C9-9B6B-4741-BDC2-3E3EC4314E31@earthlink.net>

> On Sep 26, 2013, at 4:45 PM, spr at earthlink.net wrote:
? (jones connectors give trouble)
> ? Tube sockets, such as the 11 pin octals I think you're discussing, have always worked much better for me.
>
I replied to him:
> Scott,
>
> The 11-pin "round" connectors are not the "Octal type" but rather are somewhat rare 14 pin MS types .

UPDATE:

I checked my manual for the RBA. It appears to use a NINE-pin MS style connector.

The RBB and RBC use FOURTEEN pin MS style connector.

It appears that more digging into the manuals is in order for me before I have complete information.

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From kd5byb at kd5byb.net Thu Sep 26 19:50:39 2013
From: kd5byb at kd5byb.net (Ben Hall)
Date: Thu, 26 Sep 2013 18:50:39 -0500
Subject: [BoatAnchors] HP 400H update...

Message-ID: <5244C84F.1010708@kd5byb.net>

Good evening all,

Last night after some advice from Arden, I decided to take a real close look at the voltage reference tube.

Earlier in my troubleshooting process I had already done this and concluded that the 5651 was providing a nice, steady voltage reference. However, that was likely done with a 10X probe on the 465M, so I switched to a 1X and tried it again.

Well low and behold, at the highest scope gain setting, it was clear that the 5651 was anything but clean. I saw lots of extremely fast rise spikes, both above the regulated voltage and below.

This evening, I got out my supply of 5651's from the garage and substituted for the one in the 400H. Very little, if any change. The spikes were still there, even after trying four different tubes.

I then decided to do an experiment. I added a 0.01uF film cap across the 5651. Things settled down a good bit, but still had some noise. I then replaced the 0.01uF ceramic cap that bypassed the reference voltage at the 6U8 triode section and things improved a little bit more.

But, the needle was still quite jumpy - two or three divisions. Much more than the half a division the manual notes is acceptable.

Arden and others suggested looking for arcing with either a length of hose or a length of wood, like a chopstick. I tried the hose first - transformer was silent, filter caps were silent.

I then put the hose on the 6AX5 rectifier tube and I hear very faint noises that sound like a Geiger counter. They correspond to the needle jumps.

Okay, bad 6AX5. So I pull the 6AX5 and feed 400 VDC to the rectifier filter cap. I no longer see the spikes on the 5651 voltage reference line, but the needle is still jumping around just like when the 6AX5 was in there. Ggrrrr...

I am going to put in an order for a 6AX5 to make sure I wasn't hearing things.

While I'm doing that, I want to check for bad grounds. The DMM didn't tell me much - everything to it looks okay. I'm thinking about pushing on the riveted connections with a piece of dowel while looking for wild meter deflections. Is there a better way?

thanks and 73,
ben, kd5byb

From k1lky at earthlink.net Thu Sep 26 20:02:03 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Thu, 26 Sep 2013 20:02:03 -0400
Subject: [BoatAnchors] connector quandry
In-Reply-To: <FC054D42-2949-474D-B1F0-41FFDAB1B47F@earthlink.net>
References: <1380226596.95515.YahooMailNeo@web5706.biz.mail.ne1.yahoo.com>
 <FC054D42-2949-474D-B1F0-41FFDAB1B47F@earthlink.net>
Message-ID: <1CB41DE0-4490-4720-A514-7E3C082E64A7@earthlink.net>

On Sep 26, 2013, at 5:39 PM, Roy Morgan <k1lky at earthlink.net> wrote:

> On Sep 26, 2013, at 4:16 PM, Mike Durff <mike at oldaudio.net> wrote:
>
>> Now that I am in possession of RBA-BB-BC sets with two power supplies, I find that the connectors on the RBA & one of the RBC are non standard.

UPDATE,

I have examined the (digital) manuals I have here and send my apologies to Scott for sending a bogus picture showing a FOURTEEN pin connector.

It appears that the RBA, the RBB and the RBC all use a NINE pin connector on the power supply to radio cable, with appropriate chassis connectors on the respective units. Here is info I gleaned from manuals. I hope this is useful in the searches for the right connectors. I have included info I found on the power supply inductors and transformer since it will help figure out loads and such.

RBA, RBB, AND RBC Connectors and related info:

From file: "RBB RBC -1 -2 Section 3.pdf"
"The meter M301 indicates the "B" supply voltage
?
For normal operating conditions, the meter should indicate approximately 200 volts?
For emergency condition, where two receivers are operated from one rectifier power unit, the meter should indicate approximately 175 volts."

Receiver power connector (from power supply)

from file RBB-RBC -1 -2 Section6.pdf
Page 6-49

J-301
Power Receptacle
9 contacts
Navy Type Number: JAN-3102-28-4S

Rear audio output connector
J-302
Output Receptacle
"3 silver plated contacts, female, not grounded"
Navy type number -49161

From file RBB-RBC -1 -2.pdf section 6
Page6-68

Power cable plug - male
P-402 and P-403 (Both)
Output Plug (part of power cable W-401)
Male 9 contacts, silver plated ?..
Jan-3108-28-4P
Manufacturer 131   CED Cannon Electric Development Co.

Line Cord (power supply end) connector:
P-401
110 V Line Input Plug
Male, 3 pole, Ever-Lok type, Grounded contact, pins silver plated
Navy type number -49125
Manufacturer no. 576: CSR Russel and Stoll, Inc.

From NAVSHIPS 900473.pdf
RBA manual
("The current taken from the 6.3 volt AC circuit is 2.95 amperes.
The current drain on the 200 volt circuit is approximately 55 mili-amperes
and on the 105 volt circuit 1 milli-ampere.
?
The actual voltage across the (plate voltmeter -one terminal of the voltmeter is at 200 volts!) circuit may vary between 175 and 225 volts, depending upon the adjustment of various receiver controls, and upon whether one or two receivers are operated from the power unit.")

Pg 10
Power supply power (line) input receptacle
J-401 Power Input Receptacle
3 Pole, Female, Silver plated contacts

Navy Type Number -49126
Mfgr 7

Power Output Receptacle
J402 and J403
9 Contacts ?
Navy Drwng No. AN-9534
Mfgr 3

Pg 11
Power supply:

P401 110V Line Input Plug
3 pole, male Grounded
Mfgr 7
MFGR Description: Ever-Lok
Navy type number 49125

P402, and P403 Output Plug
"L" Shaped, Male, 9 contacts
Navy type No. 49125
Navy Drawing No. AN-3108-28-4P
Mfgr 8 CED Cannon Electrical Development Co.
MFGR Description: 210?-7

W-401 Power Cable Assembly
Consists of:
Army-Navy type AN-3108-28-4P nine contact plug on each end of a 67 inch long flexible shielding conduit, contains 9 color coded wires.
Navy type -49162
MFGR 1 CRV Radio Corporation of America

Power supply chokes:
L-405, L-406 Reactor, 10 henries +/- 5%
3150 turns tapped at 3081 turns
DC resistance 1x6 ohms (156?)
MFGR's designation: XT-3496A
Mfgr 1 CRV Radio Corporation of America

Power transformer:

Primary windings: 110, 115, 120 volts

Secondaries:
550 volts center tapped rated current 0.120 amps
(Half winding resistance:; 43.6 ohms)
6.3 volts 11.1 amps center tapped
17 volts 1.2 amps
5 volts 3 amps
MFGR's designation: XT-3496A
Mfgr 1 CRV Radio Corporation of America

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From WA5CAB at cs.com Thu Sep 26 20:13:05 2013
From: WA5CAB at cs.com (WA5CAB at cs.com)
Date: Thu, 26 Sep 2013 20:13:05 -0400 (EDT)
Subject: [BoatAnchors] connector quandry
Message-ID: <f87a8.63fc2393.3f762791@cs.com>

All three receivers and both power supply models use the same 9-pin AN connectors. AN 3102-28-4S on the power supplies and receivers and AN 3108-28-4P on the cables. Later numbers are MS 3102A-28-4S and MS 3108A-28-4P.

I have four of the chassis ones and one of the cable ones. But I'm sure Bill P has some.

In a message dated 09/26/2013 16:54:21 PM Central Daylight Time,
k1lky at earthlink.net writes:
> UPDATE:
>
> I checked my manual for the RBA. It appears to use a NINE-pin MS style
> connector.
>
> The RBB and RBC use FOURTEEN pin MS style connector.
>
> It appears that more digging into the manuals is in order for me before I
> have complete information.
>

> Roy
>
> Roy Morgan
> RoyMorgan at alum.mit.edu
> K1LKY Since 1958 - Keep 'em Glowing!
>

Robert Downs - Houston
wa5cab dot com (Web Store)
MVPA 9480

From gumbear at pacbell.net Thu Sep 26 20:10:49 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 26 Sep 2013 17:10:49 -0700
Subject: [BoatAnchors] HP 400H - back to the beginning
References: <13060618.1380222034509.JavaMail.root@wamui-june.atl.sa.earthlink.net>
Message-ID: <003301cebb19$04f08090$4301a8c0@KB6NAX>

"..random perodicity.."

That's an oxymoron, Scott.

Yes, it's a stretch, that's why I said the other million possiblities should be eliminated first.

Arden Allen
KB6NAX0

From gumbear at pacbell.net Thu Sep 26 20:32:12 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Thu, 26 Sep 2013 17:32:12 -0700
Subject: [BoatAnchors] HP 400H update...
References: <5244C84F.1010708@kd5byb.net>
Message-ID: <003401cebb19$05430d60$4301a8c0@KB6NAX>

> ....I added a 0.01uF film cap across
the 5651. ....

At some value of shunt capacitance, according to the book, your gas reference tube will become a relaxation oscillator. Remember what I said before, in a closed loop system, which the regulator system is, any perturbation will be seen everywhere. Also, fast spikes produce bursts of RF that are seen everywhere and more. Remember the scope probe is not immune to outside influences, the longer the grounding jumper the more the pickup of RF.

Total isolation from the AC power line may be revealing.

Arden Allen
KB6NAX

I love a dog. He does nothing for political reasons.
-Will Rogers

From WA5CAB at cs.com Fri Sep 27 00:43:08 2013
From: WA5CAB at cs.com (WA5CAB at cs.com)
Date: Fri, 27 Sep 2013 00:43:08 -0400 (EDT)
Subject: [BoatAnchors] connector quandry
Message-ID: <fbc68.50b11bf7.3f7666dc@cs.com>

Another reason not to tie the outputs of the two supplies together is that if for some reason the fuse blew in one supply, the other supply would try to run the first back through the filament winding. One might assume that this would immediately blow the fuse in the still working supply. But it might not.

In a message dated 09/26/2013 15:29:19 PM Central Daylight Time,
mike at oldaudio.net writes:

> The fact that I have three radios and only two supplies complicates
> matters further. I've heard that you can run two sets from one supply, but
> methinks it would be smarter to run 3 radios from two supplies in parallel, so
> as to not overtax either supply. At this point, I'm assuming all three
> radios use the same supply voltages. (I'll look in the manuals before I proceed
> with this plan).

Robert Downs - Houston
wa5cab dot com (Web Store)
MVPA 9480

From arc5 at ix.netcom.com Fri Sep 27 10:45:15 2013
From: arc5 at ix.netcom.com (David Stinson)
Date: Fri, 27 Sep 2013 09:45:15 -0500
Subject: [BoatAnchors] Blind Copy Functionality
Message-ID: <21B040074A1D40FDA44BF5A73B91A3D0@CompaqSR5710F>

Looks like "Blind Copy" (unlinks that post from other lists and other addresses, solving the "crossposting" problem) is functional for yahoogroups.com but not for the mailman.qth.net mail lists.

From spr at earthlink.net Fri Sep 27 13:00:30 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Fri, 27 Sep 2013 10:00:30 -0700 (GMT-07:00)

Subject: [BoatAnchors] HP 400H update...
Message-ID: <30270613.1380301231834.JavaMail.root@wamui-hunyo.atl.sa.earthlink.net>

Ben wrote:
>
>While I'm doing that, I want to check for bad grounds. The DMM didn't
>tell me much - everything to it looks okay. I'm thinking about pushing
>on the riveted connections with a piece of dowel while looking for wild
>meter deflections. Is there a better way?
>

and Scott remarks:

If the chassis is not aluminum, get out your Big Bertha iron and can of rosin slux and solder 'em all! This removes them as an issue, permanently.

/scott

From gumbear at pacbell.net Fri Sep 27 16:07:43 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Fri, 27 Sep 2013 13:07:43 -0700
Subject: [BoatAnchors] HP 400H update...
References: <30270613.1380301231834.JavaMail.root@wamui-hunyo.atl.sa.earthlink.net>
Message-ID: <000701cebbbd$3fccc300$4301a8c0@KB6NAX>

>>Ben wrote:
>>
>>While I'm doing that, I want to check for bad grounds. The DMM didn't
>>tell me much - everything to it looks okay. I'm thinking about pushing
>>on the riveted connections with a piece of dowel while looking for wild
>>meter deflections. Is there a better way?
>>

> and Scott remarks:

If the chassis is not aluminum, get out your Big Bertha iron and can of rosin slux and solder 'em all! This removes them as an issue, permanently.

Chassis is aluminum, Scott. The way I check for high resistance riveted terminals is pass .1 or 1 amp through them and measure the voltage drop four terminal (Kelvin) style. The current source can be a lab supply with the current limit set to the test current. A good, solid riveted joint will be about 10 milliohms (10 milliohms is a standard test limit for earth safety chassis grounds). Bad riveted terminals will be much higher.

However I don't give much credence to Ben's problem being a bad rivet because of the random spikes he is abserving that are synchronous with the meter movement jumping. As I said before, the 400 series meters are video, nay RF amplifers with a bunch of dB gain. With the cover off they are more open to line noise and spikes on the AC line coming from switches and relays opening and closing and can be coming from as far away as your the surroungind neighbors. Lights going on or off, appliances starting and stopping, yadda, yadda. A line noise problem can be deduced by feeding AC to the instrument throuh an isolation transformer followed by at least a one section RF blocking pi filter. A good common mode filter can be hacked out of a computer power supply board. Don't bypass the filter by connecting the earth (green wire) ground. Don't connect the scope to the instrument as it will bring in noise. Watch the meter movement for indication of improvement with the cabinet on and screwed down tight.

Arden Allen
KB6NAX

The great pleasure of a dog is that you
may make a fool of yourself with him
and not only will he not scold you,
but he will make a fool of himself too.
-Samual Butler

From jerry7proc at yahoo.com Sun Sep 29 13:00:57 2013
From: jerry7proc at yahoo.com (Jerry Proc)
Date: Sun, 29 Sep 2013 10:00:57 -0700 (PDT)
Subject: [BoatAnchors] Canadian Marconi Home Entertainment Radios
Message-ID: <1380474057.37079.YahooMailNeo@web121105.mail.ne1.yahoo.com>

Hello Everyone,
?
Over the last few years I have been collecting photos of
Canadian Marconi vacuum tube home entertainment radios which have shown up on
E-bay and a few other sources.? They are now posted to: http://jproc.ca/marconi/home_ent/index.htmlas an initial web page release. There is still a lot of research work ahead as
the proliferation of model numbers is staggering! The featured radios are from the late 1920's and onwards.

Since many of these sets shared the "All-American 5" design (either with octal or? miniature?tubes) , it seems to me that the only discriminator to spur radio sales was to change the cabinet style frequently. The competition must have been fierce in those days. ? ?

--
Regards,
Jerry Proc
E-mail: jerry7proc at yahoo.com

```
From jerry7proc at yahoo.com  Sun Sep 29 14:10:17 2013
From: jerry7proc at yahoo.com (Jerry Proc)
Date: Sun, 29 Sep 2013 11:10:17 -0700 (PDT)
Subject: [BoatAnchors] Canadian Marconi Home Entertainment Radios
     (Correction)
In-Reply-To: <1380474057.37079.YahooMailNeo@web121105.mail.ne1.yahoo.com>
References: <1380474057.37079.YahooMailNeo@web121105.mail.ne1.yahoo.com>
Message-ID: <1380478217.77121.YahooMailNeo@web121104.mail.ne1.yahoo.com>
```

The Yahoogroups server mangled the URL in my last e-mail mail. It should read as:?
?http://jproc.ca/marconi/home_ent/index.html

--
Regards,
Jerry Proc
E-mail: jerry7proc at yahoo.com

____
From: Jerry Proc <jerry7proc at yahoo.com>
To: "boatanchors at theporch.com" <boatanchors at theporch.com>
Sent: Sunday, September 29, 2013 1:00:57 PM
Subject: [BoatAnchors] Canadian Marconi Home Entertainment Radios

Hello Everyone,
?
Over the last few years I have been collecting photos of
Canadian Marconi vacuum tube home entertainment radios which have shown up on
E-bay and a few other sources.? They are now posted to: http://jproc.ca/marconi/
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research work ahead as
the proliferation of model numbers is staggering! The featured radios are from the
late 1920's and onwards.

Since many of these sets shared the "All-American 5" design (either with octal or?
miniature?tubes) , it seems to me that the only discriminator to spur radio sales
was to change the cabinet style frequently. The competition must have been fierce
in those days. ? ?

--
Regards,
Jerry Proc
E-mail: jerry7proc at yahoo.com

____
BoatAnchors mailing list
BoatAnchors at theporch.com
https://minime.theporch.com/mailman/listinfo/boatanchors

From jharper at secureoutcomes.net Mon Sep 30 10:52:12 2013
From: jharper at secureoutcomes.net (Jack Harper)
Date: Mon, 30 Sep 2013 08:52:12 -0600
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
Message-ID: <mailman.607.1380552653.312.boatanchors@theporch.com>

Greetings to the List...

I was out of town last week on business, but managed to get some work in on the HX-500 transmitter over the weekend (I leave again tomorrow - no rest for the wicked...).

I checked all of the tube pin voltages and all of the about 150+ pins read ok except for eight - mostly in the VOX circuits...

However, late last night I powered the transmitter up for the nth time (I had to use little microclips to get into some sockets) and there was a horrible arcing sound - similar to the alien ray gun effect in the (recent) movie "War of the Worlds" - sort of a 60hz arc welder ragged noise - quite loud. The lights dimmed and the XYL came running down to see if I had *finally* electrocuted myself ("You're going to put your eye out!", "You're going to burn the house down!", etc - you know the drill :).

I, of course, rapidly pulled the power cord and the arc went on for perhaps a second.

I could see nothing out of the ordinary under the chassis after I stopped shaking, but when I set the transmitter flat on the work bench, I pulled the 5R4 out of its socket and there was a blasted black carbonized path from pin-8 (HV) all the way to the chassis where it left a black flash mark. I could pick the carbonized tube socket material away with my fingernail - black chalk.

See http://frobenius.com/5R4%20Pin%20Arc.jpg for
a snapshot - the empty hole, by the way, to the
left of the 5R4 socket is where one of the
12AX4's used to be before the power supply
modification that replaced those with a solid
state diode for instant bias voltage.

Question: What would cause a nasty pin-to-chassis arc over like that?

Previously, I measured the +HV and it is
something like 1200 - 1300VDC at initial power up
and then rapidly (few seconds) drops to a steady +780 as the supply comes up.

A friend in the audio world told me a couple
weeks ago that someone told him that you should
never use DeOxit on tube pins as it leaves an
oily residue behind. I admit that I did that
about a month ago - I put a tiny amount of DeOxit
on each tube pin and then inserted/re-inserted each tube three times.

Could that be the culprit?? Do 60-y/o tube
sockets eventually give up the ghost under an initial 1300VDC potential?

However, I can not detect any oily residue on the
remaining part of the blasted tube socket.

Question: I must replace the octal socket and
have none in the junk box. I see that
PartsExpress (I think it is) has some nice
looking ceramic octal sockets for a couple
dollars. Any comments on using a white ceramic socket?

Question: Early this morning before work, I
powered the transmitter up without the 5R4 tube
inserted and measured normal voltages on all of
the other power supply outputs. I measured (power
off) the HV secondary winding resistance on the
power transformer and got 180-ohms. Does that
sound about right. Obviously, I am worried that I
blitzed the transformer HV winding - the 6A
Slo-Blo fuse did not pop during the arcing...

All advice and counsel appreciated.

Regards to the List -

Jack, W?YJ ("Friend to all things Hammarlund - even Transmitters!")
Evergreen, Colorado USA

From smithab11 at comcast.net Mon Sep 30 11:34:54 2013
From: smithab11 at comcast.net (B. Smith)
Date: Mon, 30 Sep 2013 11:34:54 -0400
Subject: [BoatAnchors] Call Book Look UP
Message-ID: <52499A1E.4030302@comcast.net>

I have two stations that I need to be looked up in the Callbook
1963,1964, 1965,1966 time period.
Any assistance appreciated.

73

breck k4che

From anchor at ec.rr.com Mon Sep 30 11:38:23 2013
From: anchor at ec.rr.com (Al Parker)
Date: Mon, 30 Sep 2013 11:38:23 -0400
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
In-Reply-To: <mailman.607.1380552653.312.boatanchors@theporch.com>
References: <mailman.607.1380552653.312.boatanchors@theporch.com>
Message-ID: <52499AEF.6060909@ec.rr.com>

Hi Jack,
(got your other email 20 min. b4 this one, tnx)
That's not an uncommon problem on the rectifier socket. I haven't
looked at mine, but suspect it's a "black plastic" one, the ceramic is

an excellent replacement. The arc-over isn't uncommon in Collins 516-F?? supplies, for the S-ine & KWM-2's. The high initial power-up voltage is the culprit. It rarely over stresses the HV wining, an arc isn't a direct short, but I guess has some current limiting characteristics (I'm surmising), so, the primary fuse wouldn't necessarily blow. (I think it usually does/did in the Collins supply.)

I think you'll be in good shape with a new socket. You probably won't be able to clean the carbon track out enough in the old plastic one.

I'd be happy to work you HX-500 to HX-500 on CW when you get it on the air (or loan you a mic).

Don't take the audio guy's worries seriously, I've never had such a problem with DeOxit, but you don't want to power up until it dries. The problem is more likely caused by some dirt/dust causing a slightly conductive path to gnd.

73,

Al, W8UT
www.boatanchors.org
www.hammarlund.info

"There is nothing -- absolutely nothing -- half so much
worth doing as simply messing about in boats"
Ratty, to Mole

On 9/30/2013 10:52 AM, Jack Harper wrote:

> Greetings to the List...
>
> I was out of town last week on business, but managed to get some work in on the HX-500 transmitter over the weekend (I leave again tomorrow - no rest for the wicked...).
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> I checked all of the tube pin voltages and all of the about 150+ pins read ok except for eight - mostly in the VOX circuits...
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>
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> I could see nothing out of the ordinary under the chassis after I stopped shaking, but when I set the transmitter flat on the work bench,

> I pulled the 5R4 out of its socket and there was a blasted black carbonized path from pin-8 (HV) all the way to the chassis where it left a black flash mark. I could pick the carbonized tube socket material away with my fingernail - black chalk.
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> See http://frobenius.com/5R4%20Pin%20Arc.jpg for a snapshot - the empty hole, by the way, to the left of the 5R4 socket is where one of the 12AX4's used to be before the power supply modification that replaced those with a solid state diode for instant bias voltage.
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> Question: What would cause a nasty pin-to-chassis arc over like that?
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> All advice and counsel appreciated.
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> Regards to the List -

>
> Jack, W?YJ ("Friend to all things Hammarlund - even Transmitters!")
> Evergreen, Colorado USA
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> ____
> BoatAnchors mailing list
> BoatAnchors at theporch.com
> https://minime.theporch.com/mailman/listinfo/boatanchors
>

From gumbear at pacbell.net Mon Sep 30 13:23:01 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 30 Sep 2013 10:23:01 -0700
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
References: <mailman.607.1380552653.312.boatanchors@theporch.com>
Message-ID: <003401cebe02$a6106f30$4301a8c0@KB6NAX>

> ...."War of the Worlds" .....

I saw that movie as a kid. It was still exciting as an adult (the kid in me never left).

Oil, shmoil! I regulary douse tube sockets with WD-40 or my contact cleaner coctail of trichlorethane and mineral oil. Never had a problem but I don't think I've been above 600 volts with that but reglarly up to 550 volts, half of what your socket had to endure. The problem lies in the close spacing of pins 2 and 8 with chassis metal, barely more than a tenth of an inch. I would replace the socket with a top mount socket which will provide a longer path between the pin sockets and chassis. If it were mine I'd treat with WD-40 without worry.

Arden Allen
KB6NAX

Adopt a shelter dog,

save an innocent life,
and make a friend forever =:-)

From wb0eq at yahoo.com Mon Sep 30 13:49:13 2013
From: wb0eq at yahoo.com (John Sehring)
Date: Mon, 30 Sep 2013 10:49:13 -0700 (PDT)
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter... (Jack Harper)
Message-ID: <1380563353.35936.YahooMailNeo@web161001.mail.bf1.yahoo.com>

Looking at the Hammarlund hx-500 schematic shows a few odd (IMO) things...

While it has a pi-network output, it only has a control for the plate resonance, not any load control. ?That's not good for versatility.

It does not use an xtal sideband filter. ?Instead, more than 10 tuned circuits at 60 kHz. ?A joy to align I'm sure. ?

This was a giant step backward as the HX-500's predecessor, the HX-50 ("Drifty Fifty") did use an xtal sideband filter. ?Only a few of the very early SSB xmtrs used the -500's method, e.g. Hallicrafter HT-30 (very rare, I assume vy few sold).

It's got too darn many tubes, 20 of 'em and way too much complexity for what it does!?

By comparison, Drake's T-4any uses only 10 tubes to do same in a much smaller package. ?I can't easily reach my Collins S-Line xmtr schematic but I suspect it has about the same number of tubes as the Drake & small size. ?The latter two xmtrs are of course excellent performers.

I am of course heavily prejudiced against all things Hammarlund. ?

I victimized myself for many years trying to keep an HX-50 running. ?Nobody to blame but me. ?However, burn me once, shame on you, burn me twice, shame on me! That period of insanity (temporary I hope, you be the judge!) happened before there was a BA list, so I had to go unmedicated into that dark night.

These humungous Hammarlund radios were about the last hurrah of the company, esp. after they moved from New York City to North Carolina. ?Sad.

Personal story...I grew up with the son of the Hammarlund sales manager. ?His Dad brought home a lot of brand new Hammarlund stuff, what fun.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From wb0eq at yahoo.com Mon Sep 30 13:55:42 2013

From: wb0eq at yahoo.com (John Sehring)
Date: Mon, 30 Sep 2013 10:55:42 -0700 (PDT)
Subject: [BoatAnchors] HP 400H update...
Message-ID: <1380563742.23845.YahooMailNeo@web161001.mail.bf1.yahoo.com>

So what is one to do with any of the Hewlett Packard electronic stuff having an aluminum chassis and steel rivets? ?The inter-material corrosion and other incompatibilities bring lots of joy to us. ?It too wrestled with the HP 400 ACVM's that had tubes, and lost. ?

Some HP's I brought from the East work better out here, i.e. fewer intermittents.
?
--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

From 1oldlens1 at ix.netcom.com Mon Sep 30 15:03:22 2013
From: 1oldlens1 at ix.netcom.com (Richard Knoppow)
Date: Mon, 30 Sep 2013 12:03:22 -0700 (GMT-07:00)
Subject: [BoatAnchors] HP 400H update...
Message-ID: <29239943.1380567803291.JavaMail.root@elwamui-norfolk.atl.sa.earthlink.net>

-----Original Message-----
>From: John Sehring <wb0eq at yahoo.com>
>Sent: Sep 30, 2013 10:55 AM
>To: Boatanchors List <boatanchors at theporch.com>
>Subject: [BoatAnchors] HP 400H update...
>
>So what is one to do with any of the Hewlett Packard electronic stuff having an aluminum chassis and steel rivets? ?The inter-material corrosion and other incompatibilities bring lots of joy to us. ?It too wrestled with the HP 400 ACVM's that had tubes, and lost. ?
>
>Some HP's I brought from the East work better out here, i.e. fewer intermittents.
>?
>--John Sehring ?VE6EQR-WB0EQ??nr Calgary, Alberta, Canada

Two suggestions: one is to use aluminum solder. It can make a joint using standard flux and a lot of heat. The other is to replace the rivets with screws. Even when screws are used its well to use toothed lockwashers to insure good contact.

From spr at earthlink.net Mon Sep 30 16:14:48 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Mon, 30 Sep 2013 13:14:48 -0700 (GMT-07:00)
Subject: [BoatAnchors] HP 400H update...
Message-ID: <5926828.1380572088584.JavaMail.root@wamui-june.atl.sa.earthlink.net>

Hi Richard,

The other thing you can do is get some #18 bus bar wire, and bond all the riveted ground points together. Then you maybe solder one or two to the chassis with aluminum solder, ones where the heat won't do local damage.

The flux used to solder aluminum is corrosive and probably toxic, so only solder areas you can thoroughly rinse afterwards, and mind the fumes.

Good luck!

/scott

-----Original Message-----
>From: Richard Knoppow <1oldlens1 at ix.netcom.com>
>Sent: Sep 30, 2013 12:03 PM
>To: John Sehring <wb0eq at yahoo.com>, Boatanchors List <boatanchors at theporch.com>
>Subject: Re: [BoatAnchors] HP 400H update...
>
>
>
>
>-----Original Message-----
>>From: John Sehring <wb0eq at yahoo.com>
>>Sent: Sep 30, 2013 10:55 AM
>>To: Boatanchors List <boatanchors at theporch.com>
>>Subject: [BoatAnchors] HP 400H update...
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>>So what is one to do with any of the Hewlett Packard electronic stuff having an aluminum chassis and steel rivets? ?The inter-material corrosion and other incompatibilities bring lots of joy to us. ?It too wrestled with the HP 400 ACVM's that had tubes, and lost. ?
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>
>
>____
>BoatAnchors mailing list
>BoatAnchors at theporch.com
>https://minime.theporch.com/mailman/listinfo/boatanchors

From gumbear at pacbell.net Mon Sep 30 18:48:42 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 30 Sep 2013 15:48:42 -0700
Subject: [BoatAnchors] HP 400H update...
References: <29239943.1380567803291.JavaMail.root@elwamui-norfolk.atl.sa.earthlink.net>
Message-ID: <001501cebe2f$3a42a6b0$4301a8c0@KB6NAX>

> Two suggestions: one is to use aluminum solder. .....

Bad idea. First, you need to scrape away the aluminum oxide layer UNDER flux if there is any chance of getting solder to alloy with the aluminum. Second, aluminum soldering flux is caustic and a potential disaster for electrics, very hard to remove the residual. Third, lots of heat required that can damage nearby components and wire insulation. Fourth, you can't get a big enough iron into cramped spaces to do the job, aluminum is a good heat sink.

Arden Allen
KB6NAX

Blessed is the person who has earned the love of an old dog.
- Sydney Jeanne Seward

From gumbear at pacbell.net Mon Sep 30 18:38:28 2013
From: gumbear at pacbell.net (Arden Allen)
Date: Mon, 30 Sep 2013 15:38:28 -0700
Subject: [BoatAnchors] HP 400H update...
References: <1380563742.23845.YahooMailNeo@web161001.mail.bf1.yahoo.com>
Message-ID: <001401cebe2f$39e56b80$4301a8c0@KB6NAX>

> ......So what is one to do with any of the Hewlett Packard electronic stuff having an aluminum chassis and steel rivets? The inter-material corrosion and other incompatibilities bring lots of joy to us. It too

wrestled with the HP 400 ACVM's that had tubes, and lost. .....

The cause is only lost when one gives up the battle. I have lots of HP stuff and have had almost no problems with rivets on the aluminum chassis, HP did a good job with those but 100% is never achieved by anybody. By using the method I suggested, measuring the resistance by the Kelvin method, any misbehaving rivets can easily be found and repaired. Drill or Dremel the rivet out and replace it with a stainless steel or Allen cap head screw, both types preferrable to mild steel or brass screws, and a small pattern nut.

The Kelvin method, simplified:

Set the output voltage of a power supply to 10 volts. You only need 100 mA so even a DC wall wart will do. Apply 100 mA though a current limiiting resistor to a dead short, measure the voltage across the resistor to varify the current.

For example, 10 volts / 100 mA = 100 ohms, says Mr. Ohm.

Connect one lead of the current source anywhere to the chassis, the other lead to the riveted ground lug. With your DVM or HP 412A on it's most sensitive range, probe the ground lug and the chasis next to the rivet. A ten millivolt reading indicates a 100 milliohm resistance, too high for a good riveted connection. With your third hand you can wiggle the lug to see if the resistance varies. Keep in mind though, not all circuits are put askew by a higher than optimum resistance ground connection so choose wisey what needs repair instead of wholesale making work for yourself.

Arden Allen
KB6NAX

If you get to thinking you're a person of
some influence, try ordering somebody
else's dog around. -Will Rogers

From k1lky at earthlink.net Mon Sep 30 18:57:56 2013
From: k1lky at earthlink.net (Roy Morgan)
Date: Mon, 30 Sep 2013 18:57:56 -0400
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
In-Reply-To: <mailman.607.1380552653.312.boatanchors@theporch.com>
References: <mailman.607.1380552653.312.boatanchors@theporch.com>
Message-ID: <4D0E5089-00F4-426B-8ED6-133CB06A00F1@earthlink.net>

On Sep 30, 2013, at 10:52 AM, Jack Harper <jharper at secureoutcomes.net> wrote:

> ... I powered the transmitter up ... and there was a horrible arcing sound - ... I pulled the 5R4 out of its socket and there was a blasted black carbonized path from pin-8 (HV) all the way to the chassis where it left a black flash mark. 1200- 1300 VDC on initial startup...

Sure enough, a high voltage arc.

> ...- I put a tiny amount of DeOxit on each tube pin and then inserted/re-inserted each tube three times.
> Could that be the culprit??

Unlikely but possible.

> Do 60-y/o tube sockets eventually give up the ghost under an initial 1300VDC potential?

YES. Common in the Collins supplies as you have heard.

> Question: I must replace the octal socket and have none in the junk box. I see that PartsExpress (I think it is) has some nice looking ceramic octal sockets for a couple dollars. Any comments on using a white ceramic socket?

Yes: the Collins sockets and hole are ONE INCH in diameter. Ceramic sockets that size are hard to find. MEASURE your socket and hole. Use parts express sockets (or others you may be offered) only if they will fit.

> Question: Early this morning before work, I powered the transmitter up without the 5R4 tube inserted ...

Be careful: If you apply screen voltage to tubes with out the plate supply present, you can burn out the screen. (DO not do this in a Collins S-line transmitter without disconnecting the screen supply too.

> ? HV secondary winding resistance on the power transformer and got 180-ohms. Does that sound about right. Obviously, I am worried that I blitzed the transformer HV winding - the 6A Slo-Blo fuse did not pop during the arcing?

Sounds in the ball park.

> All advice and counsel appreciated.

Post to the list the diameter of the 5R4 hole. See if someone has the right ceramic socket for you. No real need to replace lower voltage B+ rectifier sockets.

Roy

Roy Morgan
RoyMorgan at alum.mit.edu
K1LKY Since 1958 - Keep 'em Glowing!

From spr at earthlink.net Mon Sep 30 19:27:09 2013
From: spr at earthlink.net (spr at earthlink.net)
Date: Mon, 30 Sep 2013 16:27:09 -0700 (GMT-07:00)
Subject: [BoatAnchors] Hammarlund HX-500 Transmitter...
Message-ID: <7133744.1380583629686.JavaMail.root@wamui-june.atl.sa.earthlink.net>

Folks,

If you have access to a 1-5/32 inch (or close approximation) chassis punch, make the hole bigger, get a properly sized ceramic socket, and never have this trouble again.

/scott

-----Original Message-----
>From: Roy Morgan <k1lky at earthlink.net>
>Sent: Sep 30, 2013 3:57 PM
>To: Jack Harper <jharper at secureoutcomes.net>
>Cc: boatanchors at theporch.com
>Subject: Re: [BoatAnchors] Hammarlund HX-500 Transmitter...
>
>
>On Sep 30, 2013, at 10:52 AM, Jack Harper <jharper at secureoutcomes.net> wrote:
>
>> ... I powered the transmitter up ... and there was a horrible arcing sound
- ... I pulled the 5R4 out of its socket and there was a blasted black carbonized path from pin-8 (HV) all the way to the chassis where it left a black flash mark. 1200- 1300 VDC on initial startup...
>
>Sure enough, a high voltage arc.
>
>> ...- I put a tiny amount of DeOxit on each tube pin and then inserted/re-inserted each tube three times.
>> Could that be the culprit??
>
>Unlikely but possible.
>
>> Do 60-y/o tube sockets eventually give up the ghost under an initial 1300VDC potential?

>
>YES. Common in the Collins supplies as you have heard.
>
>> Question: I must replace the octal socket and have none in the junk box. I see that PartsExpress (I think it is) has some nice looking ceramic octal sockets for a couple dollars. Any comments on using a white ceramic socket?
>
>Yes: the Collins sockets and hole are ONE INCH in diameter. Ceramic sockets that size are hard to find. MEASURE your socket and hole. Use parts express sockets (or others you may be offered) only if they will fit.
>
>> Question: Early this morning before work, I powered the transmitter up without the 5R4 tube inserted ...
>
>Be careful: If you apply screen voltage to tubes with out the plate supply present, you can burn out the screen. (DO not do this in a Collins S-line transmitter without disconnecting the screen supply too.
>
>> ? HV secondary winding resistance on the power transformer and got 180-ohms. Does that sound about right. Obviously, I am worried that I blitzed the transformer HV winding - the 6A Slo-Blo fuse did not pop during the arcing?
>
>Sounds in the ball park.
>
>> All advice and counsel appreciated.
>
>Post to the list the diameter of the 5R4 hole. See if someone has the right ceramic socket for you. No real need to replace lower voltage B+ rectifier sockets.
>
>Roy
>
>Roy Morgan
>RoyMorgan at alum.mit.edu
>K1LKY Since 1958 - Keep 'em Glowing!
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>____
>BoatAnchors mailing list
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